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CLINICAL REPORTS ON RENAL AND URINARY DISEASES.

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CLINICAL REPORTS

ON

RENAL AND URINARY DISEASES,

WITH COMMENTS.

BY

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PREFACE.

The wards of the Liverpool Royal Southern Hospital are under the superintendence of highly-trained and well-educated women, thoroughly devoted to their high calling. Besides the general advantage to the patients of such a supervision as these ladies exercise, there is the further advantage to the physician of being able to carry out, by means of the intelligent co-operation that they are always willing to give, continuous observations of an interesting and important character requiring scrupulous exactness; observations that would be impossible under any other system. It is mainly to the systematic daily, and sometimes almost hourly, personal supervision which they have cheerfully given to particular cases, that I am indebted for many accurately ascertained facts relating to various diseases, some few of which are embodied in the following pages.

In those pages I have given a series of portraits, typical, I believe, of some of the chief renal and urinary disorders which come under the notice of the physician, with such comments and remarks concerning treatment as they seemed to suggest. Nearly all of the cases were under treatment in the Hospital wards, and were made the subjects of frequent clinical remarks. Of course, they are but samples selected from a very much larger number.

It being no part of my present design to write a systematic treatise on renal and urinary diseases, I have not given a detailed account of the chemical and microscopical methods employed in their elucidation. Feeling absolutely certain, as I do, however, that one of the most insidious of them is not unfrequently overlooked in its earlier and more remediable stage, and that even by men of great experience, through the employment of the commonly practised plan of testing for albumen by boiling, and subsequently adding nitric acid, I have briefly sketched and urged the general employment of Heller's method, *vide* p. 171. I have also given a short account of Dr. Day's mode of testing for blood. Both of these methods, as well as that of Russell and West for urea, are now, I believe, taught in many Schools of Medicine, but there are still very many practitioners who have not adopted them.

My determinations of urea were always made by Liebig's method, up to the date of Messrs. Russell and West's contribution on the subject in the *Journal of the Chemical Society* (Aug., 1874). Since that date I have always employed the very valuable method suggested by those gentlemen, one which I cannot help thinking even yet to be superior to any of the so-called improvements on it that have been published. Where unusual analyses, such as those of brain or blood, have been made, I have given the exact plan employed, so that the reader can decide whether, in his opinion, the results are reliable. Determination of phosphoric acid, chlorides, &c., when given, have been by the volumetric methods, which, in case of many normal and some abnormal constituents of the urine, such as sugar (abnormal, at least, when present in any quantity), admit of extreme accuracy. Uric acid I always determine by precipitation by hydrochloric acid, and subsequently weighing, the balance employed being one of extreme sensitiveness. I am thus particular in stating the exact methods of examination employed, because I am persuaded that a vicious system, constructed simply with the view of saving the time of the practitioner, is becoming fashionable in some quarters, though it can lead to nothing but false and confusing clinical conclusions. As an example of such a system, I will mention the one recommended by M. Albert Robin, in a recently published thesis on "Clinical Urology," &c., in which it is proposed to determine at the bedside the proportionate quantity of urea in the urine by the different appearances of the nitrate of urea formed or supposed to be formed on the addition of nitric acid; of that of uric acid by allowing a little nitric acid to run down the sides of the urine glass, and then noting the number of minutes taken to form a diaphragm of the uric acid on the surface; and of that of the phosphates, sulphates, &c., by similarly inexact processes.

What possible reliance can be placed on the conclusions obtained from the application of such methods? It would be better not to examine the urine at all chemically than to play with it in such a manner; for ignorance in this, as in many other things, is much preferable to error.

I have confined myself to an honest and accurate record of facts, and have avoided adding to the innumerable theories (unless my adhesion to the old-fashioned opinion as to the seat and cause of albuminuria can be regarded as such) which at present overload medicine, and distract its rising members from a becoming attention to its practice.

It is mainly in consequence of confining myself to such a record of cases and facts as have actually come under my own observation, that I have made so little use of the names of authorities, and not because I do not recognise their claims. No one can be more conscious than myself of the value of the work done by Dr. George Johnson especially, and also by Dr. Dickinson, of St. George's Hospital, and many others, as well as by numerous foreign physicians, in investigating renal diseases.

Though there is no novel theory in these pages, I venture to hope that there are some points of practical importance quite worthy the attention of medical men—such, for example, as that of the means of early detection of cirrhotic disease; the importance of limiting the amount of drink taken at any one time, and of affording complete freedom to the circulation in that disease; the great importance of the prevention of albumenoid disease, &c.

In expressing measurements, I have generally used the oz., but sometimes the c.c. Whenever I have given both, one has been expressed in terms of the other, not on the authority of any published table of their relative values, but on actual measurements of ounces into c.c.'s, or *vice versâ*, by means of the standard measures which I always employ.

My best thanks are due to my friend, Dr. Sibley Hicks, for his ready kindness in giving me the advantage of his great skill as a practical manipulator in the preparation of some of my most interesting microscopic sections.

Nov. 1878.

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In drawing up reports of the following cases which have occurred in my own practice—hospital and private—during the last ten years, I have, for the sake of practical convenience, grouped them under different heads, according to their more prominent clinical features, rather than to their real or supposed pathological alliances. Indeed, while opinions as to the nature of the changes which take place in the histological elements of the kidney, and as to the order in which those changes occur in diseases of that organ, are so unsettled, it does not seem possible to make them serve—except in a very general way—as the basis for a classification. But, by means of certain broad clinical features, the observer is well able to recognise family groups into which the diseases are divisible, and this quite independently of any views as to their pathology which may happen to be current at the time. If any apology were needed for this course it could be found in the simple enumeration of names, all of them more or less involving particular theories as to the structures affected, or as to the nature of the morbid process of which these structures are the subject, employed by different authors for essentially similar diseases, such as acute and chronic desquamative nephritis of Dr. George Johnson, tubal nephritis of Dr. Dickenson, catarrhal nephritis of Rosenstein, parenchymatous nephritis of Virchow, for one variety; chronic desquamative nephritis of Dr. G. Johnson, epithelial cirrhosis of Charcot, cirrhotic kidney of Grainger Stewart, and interstitial nephritis of many writers, for another variety; and in the admissions of pathologists of the highest repute concerning the present unsatisfactory condition of this department of their subject. Thus, Rindfleisch says:—"The morbid anatomy of renal inflammation has been repeatedly investigated; and yet it is still the most incomplete chapter in the whole of our science. As we are far from being able to draw an anatomical picture of the stages of nephritis, we must regard the attempts made by Rayer, Forster, and others, to draw sharp lines of distinction between simple, albuminous, parenchymatous, interstitial, and croupous nephritis as wholly premature."*

Concerning the broader pathology of the kidney, however, there need be no doubt. Every physician who has studied the subject must frequently have seen the following varieties, and could associate each in his mind with a tolerably definite group of symptoms, even if not actually familiar with the case, viz.:—A kidney somewhat larger and redder than natural, quite smooth, full of blood, and evidently the subject of acute arterial congestion or inflammation; secondly, one which, though also larger than natural and quite smooth, is white instead of red, somewhat loose and flabby, with large stellate veins on its surface, and with a marked contrast between the deep colour of the pyramids and that of the bloodless cortex; thirdly, one which, though like the preceding—large, generally, also like it, smooth, and white—differs from it in being of a firmer and denser texture, resisting more the entrance of the section-knife, and causing some slight resistance to its withdrawal, owing to the sides of the blade sticking to the cut surfaces, and which is of a high specific gravity, which, unlike the previous one, has few or no engorged veins, and which, when a diluted solution of iodine is applied to a section, shows dark lines and points here and there through the cortex, such lines and points contrasting strongly with the generally yellowish stain produced by the reagent; fourthly, a kidney more or less diminished in size, red or grey in colour, with an uneven, granulated surface, thickened and adherent capsule, and with a marked decrease in its cortical portion, on the surface and through the structure of which are a number of small cysts; fifthly, the cancerous kidney, often very large, very uneven, and very hæmorrhagic; sixthly, the tuberculous or scrofulous kidney, large, nodulated, pale, with cheesy masses and ulcers of various sizes occupying its structure; seventhly, the pyæmic kidney, with its numerous small abscesses, each surrounded by an inflamed area; and lastly, the enlarged cyst-like kidney of hydronephrosis. About these types, and probably others—such as the kidney of chronic cardiac disease, that might be mentioned—there would probably be no dispute. It is only when an interpretation of the *microscopic* appearances in one or the other case is attempted, or of the relation, or supposed relation, which the members of the various groups bear to each other, that differences of opinion arise.

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* Rindfleisch, *Pathological Anatomy*, Syd. Soc.'s Translation, 1873, vol. ii. p. 136.

Instead, therefore, of following the theoretically more scientific plan of grouping the cases according to their pathological, or assumed pathological, changes, I have preferred to place together those having a certain clinical resemblance, as being a method more useful and practical; and to discuss current views of pathology incidentally.

There are certain broad features by which, clinically, one set of cases may be usefully discriminated from another. For example, there are cases in which dropsy forms a most striking symptom, of which cases some are acute, others chronic; and it is as well that these, for purposes of treatment, prognosis, &c., be grouped apart from each other. There are others, again, in which dropsy is seldom or never a prominent symptom, and in which, indeed, beyond a slight and almost unrecognised œdema of the ankles, it may not be present, the entire history of such being generally so different from that of those in which dropsy is pronounced, that they may very fairly stand clinically by themselves. In yet others, the presence of blood in the urine may be the most constant and alarming symptom; and others still may have permanently purulent urine, without in either case dropsy being present. In the progress of the disease, indeed, the symptoms will sometimes become so modified, that cases which at one period could be classed under one head, would at another period be classed under another; or there may be a mixture of symptoms throughout rendering it difficult to decide under which of such groups to place the case. But this want of a hard-and-fast boundary line must be equally felt where anatomical differences are taken as the basis of classification; and, on the whole, the character and course of the symptoms, in the several groups to which have alluded, are sufficiently constant and sufficiently distinctive to admit of their being fairly employed as the ground of separation clinically.

The clinical groups under which I shall range the following cases, then, are the following:—

1. Cases of acute derangement of the kidney with dropsy.
    - (*a*) Primary.
    - (*b*) Secondary to other (generally cardiac) disease.
2. Cases of chronic derangement of the kidney.
    - (*a*) With anasarca, but without any marked derangement of liver or spleen.
    - (*b*) With or without anasarca, but almost invariably with marked derangement of liver and spleen.
    - (*c*) With little or no dropsy, and no derangement of liver or spleen.
3. Cases in which hæmaturia formed the most prominent and persistent feature (including cases of hæmaturia not dependent on disease of the kidney).
4. Cases in which large quantities of pus in the urine formed a marked clinical feature.
    - (*a*) Where the disease was confined to the urinary system (pyelitis; cystitis).
    - (*b*) Where the urinary organs were involved in a more general disease (tuberculous kidney and bladder).
5. Cases, other than tuberculous and those mentioned under 1 (*b*), in which disease of the kidney occurred together with disease of some other organ in the same individual.
6. Cases of derangement of the urine not dependent on disease of the kidney.

There are two special means for determining the nature and progress of diseases of the kidney, over and above the mere grouping and march of the symptoms, by which the character and extent of so many other diseases are judged of. These are microscopic examination and chemical analysis. By careful and successive microscopic examinations of urinary deposits, and especially of the epithelial cell and tube cast, sound conclusions can often be drawn concerning the nature, advance, or retrogression of the disease. The excellent, though too clearly-defined, drawings of Dr. Basham afford admirable illustrations of the advantages of this method, which no physician who aims at understanding the subject can neglect.

The second method is none the less useful. The special function of the kidney being to secrete a fluid possessing within certain limits a standard composition, and a known anatomical structure being necessary in order to the attainment of this result, it is fair to conclude that any great and persistent departure of the urine from the normal standard is an indication of a corresponding deviation from sound structure in the organ. If, for example, there is a marked and permanent decrease in the amount of urea, which is, *par excellence*, *the* urinary product, without there being any undue action of skin to explain it, the conclusion would be legitimate enough that the secreting *structure* must be impaired. The chemical method, then, up to a certain point is as useful as the anatomical. It cannot so clearly as the latter aid in determining the *nature* of the structural changes which are taking place, but it can, better than it, determine their *degree*.

The general method by which the medical practitioner is often compelled to judge of the amount of urinary solids, is by taking the specific gravity of the urine at one particular time. But this is too general to be of much use, for not only does that which is passed at one period of the day differ widely in specific gravity from that passed at another, rendering it necessary that the mixed urine for the whole twenty-four hours should be examined, but two urines having the same specific gravity may yet differ very much from each other in the relative amounts of their solids, one having a large quantity of organic products and a relatively small quantity of salts, and *vice versâ*. Something more is, therefore, often necessary than the determination of the specific gravity, even though this be of the urine of the twenty-four hours. The amount of the chief constituents should, in particular cases at least, be determined—such as the urea and the inorganic salts; and, if the proportion of the latter is high, the quantity of any one of them which happens to be in excess should also be determined. The specific gravity is also influenced by albumen, when this is present; yet it is very seldom that the practitioner can afford the time to separate this before making his determination.

Thus, to show that the specific gravity can only indicate within wide limits the relative proportion of the most important solid of the urine, I subjoin a short list of some urines in which I have carefully determined the per-centages of urea as well as the specific gravities.

Sp. g.	Per-cent. of urea.	
1·009	·7	Contracted kidney.
1·010	·5	Acute Bright's disease.
1·011	·5	Chronic Bright's disease
1·011	1·65	Acute Bright's disease.
1·012	·86	Congestion of kidney.
1·013	·6	Contracted kidney.
1·015	1·05	Convalescent.
1·015	1·2	Patient convalescent from rheumatic fever.
1·016	·63	Ascites.
1·016	1·7	Acute Bright's disease.
1·016	·9	Case of pneumonia.
1·018	1·0	Pleuritis: albuminuria.
1·018	2·2	Healthy man convalescent from acute rheumatism.
1·019	1·6	Bright's disease, &c.
1·019	1·6	Debility.

Sp. g.	Per-cent. of urea.	
1·020	2·2	Healthy man.
1·020	4·2	Pneumonia.
1·020	2·0	Contracted kidney.
1·021	1·8	M. cordis : eczema.
1·022	2·0	Healthy man.
1·022	1·5	Addison's disease.
1·024	2·3	Healthy.
1·024	2·3	,,
1·024	3·0	Albuminuria : uræmia.
1·025	3·3	Typhoid fever.
1·026	3·5	,, ,,
1·027	2·1	Abdominal cancer.
1·028	4·15	Typhoid fever.
1·029	1·0	Healthy man.
1·029	2·0	Bright's disease.
		Phthisis.
1·030	2·7	Do.
1·035	1·2	
1·037	4·4	Healthy man taking salicylic acid.
1·041	3·4	Diphtheria, hemiplegia, albuminuria.

A second Table will show the want of correspondence between the proportions which the organic and inorganic constituents bear to each other in a number of cases.

Sp. g.	Total salts in 10 c.c.	Total organic solids in 10 c.c.	Ratio of inorganic to organic solids.
1·009	·028 gramme	·049 gramme	1 : 1·7
1·011	·064 ,,	·135 ,,	1 : 2·1
1·014	·100 ,,	·084 ,,	1 : ·84
1·015	·072 ,,	·180 ,,	1 : 2·5
1·016	·094 ,,	·078 ,,	1 : ·83
1·017	·074 ,,	·142 ,,	1 : 1·9
1·018	·090 ,,	·140 ,,	1 : 1·5
1·019	·070 ,,	·180 [illegible]	1 : 2·57
1·022	·120 ,,	·180 ,,	1 : 1·5
1·029	·184 ,,	·260 ,,	1 : 1·4
1·037	·128 ,,	·362 ,,	1 : 2·82
1·038	·202 ,,	·328 ,,	1 : 1·6
1·041	·196 ,,	·430 ,,	1 : 2·2 (nearly.)

ON CARE IN COLLECTING THE URINE.

As diagnosis and treatment must so often depend on the circumstance that the urine, when examined by the physician, is unaffected by anything that has been added to it after it has left the bladder, it may be as well to say a word or two here as to the necessity of great care in collecting it. The necessity for this cannot be too much insisted on. The least permanent incrustation on the sides of the utensil into which the urine is voided will speedily induce decomposition of urea. Some of the ammonia resulting from this decomposition, uniting with the magnesium phosphate of the urine, forms the triple or ammonio-magnesian phosphate, which, being insoluble in the liquid that has been rendered alkaline by more of the evolved ammonia (salt), is thrown down as a dense white deposit, often of considerable depth. Yet the urine might have been acid when passed, and would have remained acid and free from any deposit for many hours if it had not been subjected to causes of decomposition *after* leaving the bladder. It is often desirable, therefore, in order to avoid any mistake, to make the patient micturate into a *glass* vessel, about the absolute cleanliness of which there need be no doubt. The chief source of the confusion often arising from changes induced in the way indicated is the narrow-necked porcelain vessel, often supplied to hospital patients during the night, to obviate the necessity of their getting out of bed. The narrowness of the neck prevents the introduction of a cloth; their opacity prevents the interior from being seen; and, however carefully they may be washed by shaking water up in them, they can never be thus effectually cleansed, but are sure, after being used for some time, to retain sufficient incrustation to set up speedy decomposition. Some years ago I used occasionally to be exceedingly perplexed at the appearance of large deposits of the triple phosphates in alkaline urines, unaccompanied by ropy mucus or any other indication of vesical mischief; and, suspecting the vessel, I caused the urine in some of these cases to be voided at one time into a thoroughly cleansed urine glass, and again, after a few hours' interval, into what one would have thought was also a thoroughly cleansed night utensil. On examining the two specimens not long after, I again and again found a copious deposit of triple phosphate in that which had been passed into, and allowed for a short time to remain in, the latter, the urine itself being alkaline, while there was neither deposit nor alkalinity in that which had been voided into the glass. I do not mean to say that every urine would thus easily be changed, but certainly many would. A careful consideration of all the circumstances will often, I think, enable the physician to distinguish between the urine which has been rendered ammoniacal, by decomposition, after leaving the bladder, and that which has been similarly changed within it. In the latter case there is almost always mingled with the deposit more or less ropy mucus (so called), which has been the originator of the decomposition, whereas the former is quite free from this.

Some time after I had first observed the frequency with which urines voided into the night receptacles were rendered alkaline, notwithstanding that the receptacles were represented to have been thoroughly cleansed with hot water, I had one of these well washed out with very hot water, and then broken so that the interior could be examined. The inner surface was incrusted by a brownish deposit the eighth of an inch thick, which the water had not dissolved.

To determine the amount of change wrought by the vessel, I directed that one-half of a portion of urine voided by a patient on whom I could thoroughly rely, should be transferred from the conical urine glass into which it was passed to one of the porcelain vessels, the remainder being retained in the glass. After eight hours I examined the specimens. The portion in the glass was acid, and had a specific gravity of 1·027. That in the night vessel was strongly alkaline, and had a specific gravity of 1·031. The difference was so very great that I thought some mistake must have arisen. The nurse assured me that she had twice washed the vessel out with hot water, and that she believed it to be quite clean when it was used. To satisfy myself, I took the urine of another patient, suffering from incipient phthisis pulmonalis, which was standing in the urine glass ready for examination; and after having twice washed out with hot water one of the night vessels, divided this urine into two parts, warmed the portion to be introduced into the vessel to 100° F., so as to bring it as nearly as possible into the condition in which it would be when voided naturally from the bladder, poured it in, and then locked the two specimens up. After ten hours I examined them. That in the glass was acid, and had a specific gravity of 1·027; that in the night utensil was strongly alkaline, had a penetrating ammoniacal odour, and a specific gravity of 1·031. On evaporating 5 c.c. of each portion, carefully drying, and lastly igniting at a temperature insufficient for the volatilisation of the sodium chloride, I found the following results:—The urine from the night utensil, which had the higher specific gravity, left the smaller residue; for when dried, at 200° F., its total solids amounted to ·1155 gramme, of which ·055 gramme was inorganic and ·0605 organic;

while that from the glass yielded a total of ·188 gramme, of which ·061 was inorganic and ·127 organic. The only explanation of the facts—firstly, that the total amount of solids left after evaporation and drying was greater in the urine with the lesser specific gravity; and secondly, that the total organic residue was greater in the same urine—would seem to be the following:—The portion of the incrustation dissolved off by the urine introduced into it, was made up almost entirely of ammoniacal salts, which were volatilised at the temperature necessary for drying; and secondly, these ammoniacal salts, and the slight amount of organic matter accompanying them in the incrustation, probably set up decomposition in the urea of the introduced urine, leading to the conversion of a portion of it also into ammonium carbonate, which was likewise volatilised at the temperature required for drying.

To make quite sure that effects so different did not possibly result from any accidental substitution of one urine for another, I had one of the vessels sent to my house, and having washed it thoroughly out myself with boiling water, I voided urine partly into it and partly into a perfectly clean conical glass. On examining the two specimens *immediately*, I found their specific gravities the same, viz., 1·023; but while the portion in the glass was acid, quite clear, and of an amber colour, the other was alkaline, ammoniacal, and very turbid. When the two were examined, after an interval of three and a half hours, their specific gravities were very different, that of the urine in the glass being 1·025, while that of the other was 1·028. On the following day, after an interval of twenty-five and a half hours, the difference in specific gravity was still more marked, that of the one being 1·025 and that of the other 1·030. The portion in the glass preserved its clearness and acidity, while the other had become much more turbid and ammoniacal than it was when previously examined. There cannot, therefore, be any doubt about the very early decomposition often induced in urine owing to its being retained, though but for a very short time, in one of the urinals alluded to; and also about the impossibility of relying on the characters presented by the secretion when that mode of collecting it has been employed.

More recently a case in which there was still greater difficulty presented itself. It was that of a young sailor, aged 21, who, in the course of chronic dysentery, had become the subject of extreme irritability of the bladder. He passed water about every half-hour, but had no pain either before, during, or after micturition. The urine, when examined, was found to be very purulent and ammoniacal. Being doubtful on this latter point, I made inquiries, and was told that the urine had been voided into a clean chamber vessel. To be quite sure, I caused the patient to micturate into a conical urine glass which I had had specially cleaned. I then found that the urine was acid, and that, when cold, it deposited with the pus a thick layer of pale urates; but whenever subsequently he used the ordinary chamber vessel, speedy decomposition and alkalinity were the results. And it is as well to observe that the difference cannot be accounted for by the assumption that the urine was examined in one case immediately after being passed, and in the other only after a sufficient interval had elapsed to allow of that decomposition of urea and development of ammonia which Bartels * assumes to take place, for the acidity in the urine that was passed into the cleansed glass remained for several days. Speaking of the

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* Ziemssen's *Cyclopædia*, vol. xv. p. 23.

rapidity with which such decomposition can be effected, that author remarks: "It is only just recently that I became aware, while examining such a case, that urine just quickly passed might exhibit an acid reaction, and then, after a few hours, become distinctly alkaline; and I think it likely that the urea in highly albuminous urine, in this and other cases, rapidly undergoes ammoniacal decomposition, and that it is for this reason that the entire urine collected over twenty-four hours shows so constantly this alkalinity." But does it constantly show alkalinity? I have very frequently, indeed, examined highly albuminous urine kept over twenty-four hours, and if care had been taken to insure perfect cleanliness in the vessels, have failed to find alkalinity developed; and one of the most highly albuminous urines I have ever seen—that of Baker, whose case is given at p. 18—continued distinctly acid five days after it was passed.

It is impossible that too much value can be attached to those sound and thoroughly practical rules for urine examination given by Sir Henry Thompson in his admirable work on Diseases of the Urinary Organs, and especially to the one in which he insists on the importance of a small portion of the urine first voided during the act of micturition being received into a separate glass from that into which the rest is passed, whenever there is pus. And, indeed, it will not seem frivolously minute to those who have concerned themselves much with the morbid changes in the urine, to say that sometimes it may even be advantageous to have the last as well as the first portion kept separate; as the small quantity of blood, either pure or mingled with mucus, which is sometimes passed with much painful straining and by a separate effort after the act of micturition seems to have been quite concluded, shows, more vividly than many words could, where and what the affection really is; and shows this, moreover, much more vividly than such blood could do if it were more or less diffused through the entire quantity of the urine.

Of the more modern instruments of research the ophthalmoscope is that which more than any other assists the physician in his desire to comprehend all the relations, and many of the symptoms, of renal diseases. By its means the interesting changes characteristic of albuminuric retinitis can be traced, the occurrence of hæmorrhages noted, and other morbid processes actually watched, which, but for it, would be only a matter of remote inference from symptoms.

The sphygmometer, as determining with great readiness the varying tension of the pulse under different conditions, has already proved, and will probably prove yet more, useful; while the sphygmograph, by the still greater minuteness with which it indicates changes in arterial tension, imparts much scientific interest to observations on the progress of cases and the effect of remedies, even if it does not materially assist in diagnosis.

CHAPTER I.

ACUTE PRIMARY DERANGEMENTS OF THE KIDNEY ATTENDED WITH DROPSY.

THESE are almost always, if not always, either inflammatory or congestive; and the causes are to be sought either in the presence of morbid matters in the blood, which irritate and inflame the kidneys in their passage through those organs during elimination; or else in obstructions to the free flow of blood through the renal veins. There is very little doubt that almost any substance, except water, may be capable of exciting irritation, and even permanent inflammation, of the kidneys if taken in great excess. An undue quantity even of any of the normal constituents of the urine will do so. Sugar, as was long thought probable, but has only recently been completely demonstrated, is present in minute quantities in normal urine, yet excites no irritation, though, when in excess, as in diabetes mellitus, it is sure to do so. Several phosphates, again, are normal constituents of every urine; but, when present in great excess, they excite intense irritation, leading, in the opinion of M. Teissier, of Lyons, to a form of non-saccharine diabetes attended by grave constitutional disorder. Doubtless in the same way an abnormal amount of each of the other urinary constituents, even though they should remain in solution, and not, as is sometimes the case with uric acid and phosphate of lime,* form solid concretions within the kidney, producing irritation mechanically, would stimulate unduly the secreting cells and capillary vessels, and lead to organic derangement. The most common, however, of the irritants which lead to inflammation by the disturbances which they induce in the kidney structure during the process of elimination, are either introduced directly from without, or, if manufactured within the body, do not form part of the normal urine. The commoner members of the first group, such as turpentine, cantharides, rum, copaiba, &c., are so well known as to render it unnecessary to do more than to mention them. There are others, however, less commonly recognised, but often operative, which are, on both these accounts, worthy of notice. One of these is sewer gas. An interesting case is reported in the *Medical Times and Gazette* for July 1st, 1871, by Dr. Handfield Jones, of a man who, after working in a sewer, became ill with giddiness and shortness of breath, had œdema of the feet, and about a week later had very albuminous water, which deposited casts and renal epithelium. Although this man inhaled a large amount of the poisonous gas, and became, therefore, proportionately affected, yet it is extremely probable, as Dr. Jones remarked in commenting on the case in question, that "cases of chronic and slight poisoning by the same agent are vastly frequent." Especially is this likely to be so now that the practice has become so common of having fixed washstands in dressing and bed rooms, the pipes from which are in communication with drains; or, as is often the case in good modern houses, of having housemaids' sinks on each landing above the drawing-room, with effluent pipes discharging, without bend or trap, into the down-spout, which, in its turn, as I myself have many times seen, is in direct communication with the sewer. And even where the diluted gas thus sometimes inhaled may not be sufficient to produce irritation in the kidneys of one who is *quite* healthy, yet it might conceivably do so if a not long previous attack of scarlatina or some constitutional tendency rendered these organs susceptible to derangements from slight causes.

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* During the Winter Session of 1875-76 I exhibited, before the Microscopical Section of the Liverpool Medical Institution, a kidney containing numerous crystalline deposits of phosphate of lime among the tubuli, many of which deposits I picked out with a needle and mounted, so as to demonstrate the crystalline form.

In a similar way the close atmosphere of small over-lighted and heated rooms acts injuriously, both directly and indirectly, by impeding pulmonary transpiration and throwing extra work on other depurating organs.

CASES OF DROPSY FROM ACUTE KIDNEY DISEASE.

CASE I.—SCARLATINA, ACUTE NEPHRITIS, SEVERE AND PROLONGED VOMITING, IMPROVEMENT, RELAPSE AFTER EXPOSURE, CUTANEOUS SUPPURATION, URÆMIC ECLAMPSIA, DEATH.

John B., aged 19, a strong, well-made young man, who for some time had acted as a hospital porter, was admitted under my care into the Royal Southern Hospital, on Jan. 21st, 1878. Three weeks previously he was reported to have had slight sore throat, but had not been ill enough to discontinue his work. He was said to have had no rash. Ten days later he commenced vomiting after each meal, and this vomiting continued up to the time of admission. A few days after the commencement of his illness he was said to have spat some dark coloured blood.

I saw him for the first time on January 21st, 1878. His chief complaint then was of pain in the epigastrium and constant vomiting. He had pain also in the head. There was at that time slight œdema of the legs. The face was puffed, though naturally he had a very full face. T. 96·8° in left axilla; P. 68, weak; heart and lungs, normal. The tonsils were large and marked by a number of open follicles. On examining the skin, I found an extensive fine branny desquamation. The urine first passed was acid, pale, clear, sp. g. 1·014, and contained a very large amount of albumen (becoming nearly solidified on the application of heat and nitric acid). The slight sediment that formed was found, when examined microscopically, to be made up for the most part of cells of various kinds and from different parts of the urinary tract, with but very few casts. What there were of these were large and granular. He was removed at once to a small ward on the highest floor, for it was evident he had been the subject of scarlatina, and that he was in a condition to communicate the disease. He was directed to have the skin and hair rubbed with warm carbolized oil * (1 to 40) once daily, each rubbing to be followed by a hot bath. Poultices of mustard and linseed to the loins; solution of acetate of ammonia and water, each four ounces—two tablespoonfuls three times a day. The patient to lie between blankets, and to have warm milk and water after each dose of the medicine. Milk diet; no stimulants.

22nd. Bowels confined; to take thirty grains of compound jalap powder.

23rd. The powder produced four or five watery stools. He

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* It has often appeared to me that sufficient care is not taken to disinfect the hair of scarlatina patients by thorough daily washing and the further employment of a scented wash or pomade containing carbolic acid or other disinfectant. If the whole of the head is not thoroughly cleansed, with the rest of the body, particles are very likely to be diffused widely by brushing after having been desquamated from the scalp, and retained among the hair.

is reported to have had two rigors since yesterday's visit. Twenty ounces of urine were passed in addition to what was voided at stool.

24th. Bowels moved twice. Eighteen ounces of urine passed in twelve hours. Characters the same as before. Vomiting much relieved. Slept well.

25th. Urine for twenty-four hours, 20 oz.; 2 during day, 18 during night. Day's urine had a specific gravity of 1·017; night's, 1·015. Its characters unchanged. He slept up to 4 a.m., and then began to vomit a green clear fluid. No pain; no delirium. This fluid, which was noted on the card as "bilious," was found on examination to be free from bile.

The vomiting now became more troublesome; and, with the view of relieving it, firstly, a mixture containing diluted hydrocyanic acid and spirits of chloroform, and subsequently, in addition, 10-grain doses of nitrate of bismuth in powder, were prescribed. The bismuth controlled the vomiting to a very great degree, and whenever the symptom became very troublesome, as it did several times, we were obliged to return to that drug. The urine was now secreted in fair quantity. On the 26th, 33 oz. (12 by day, 21 by night); 27th, 47 oz. (17 by day, 30 night); 28th, 47 oz. (19 day, 28 night); 29th, 46 oz. (20 day, 26 night); 30th, 40 oz. (12 day, 28 night); 31st, 64 oz. (24 day, 40 night). The specific gravity of the night's urine on the 28th, when 28 oz. were passed, was 1·018; that both of day and night urine on the 30th, 1·014.

On February 1st he got up for a short time; but as the feet became swollen, he was desired to remain in bed. His breakfast was always rejected unless he took a warm drink before it. When this was done, the drink was vomited but the breakfast retained. I ordered for him, therefore, a cup of tea half an hour before breakfast every morning. On the 2nd of February an acne-like eruption appeared on his face, and spread during the next few days extensively. On the 5th, as he was deemed free from any risk of communicating infection, I gave directions for his removal, with every possible precaution against exposure to cold, into a lower ward. The urine during the twenty-four hours next after his removal amounted to 43 oz. (22 day, 21 night). This was the first time that the quantity secreted during the night had not been much greater than that of the day. When I visited him on the 6th I learned that, owing to the sudden breaking of a water-pipe in the street, the hospital had been deprived of its usual water-supply on the preceding day, and that, as the lift in consequence of this accident could not be worked, it had been impossible for my directions, that he should be conveyed by means of it to the lower floor, to be carried out; but that, after being well wrapped up in blankets, he had walked downstairs, and, as was discovered when he reached the lower floor, without any covering to his feet except his stockings. Whether as the result of this, I cannot say, but he was certainly worse on the following day. Besides the diminution in the amount of urine during the night, he complained of a feeling of numbness and of being very weak. T. left axilla 98·6° F.; P. 78. He had vomited twice during the 5th. No headache.

7th. Urine, 36 oz. (18 day, 18 night), pale, acid; specific gravity, 1·017; throwing down a somewhat copious deposit that looked like a dense white paste sharply defined from the supernatant liquid. This consisted almost entirely of casts, which were present in thousands—the great majority of them being large and granular, some few of a rather less diameter, convoluted, and swollen at intervals; while a still smaller number were very small and hyaline. Besides these, there were cells of various kinds, some large, spherical, and full of granular material that obscured any nucleus, if it existed; others of the same size and distinctly mono-nucleated; others, from the pelvis, of a cylindrical shape; and lastly, bladder epithelium. The urine was found to contain 1·26 per cent. of urea, which would give 13·6 grammes, or 210·8 grains, as the total quantity eliminated—very much below the normal amount for a man of his large and muscular build. This alarming change in the character of the urine corresponded with increased gravity in his symptoms. The vomiting was more frequent. He had appeared to lie in a semi-conscious state all night, and complained when I spoke to him of feeling "very strange," "quite childish," and of still having the numbness. The limbs could be moved freely. There was no defect in grasping power, and no headache. I ordered sinapisms to the loins, a hot-air bath, and the acetate of ammonia mixture to be given, followed by warm drinks during the bath as well as at the other periods of administration. There was some perspiration, but the urine became still scantier, and its specific gravity less. Thus, on the morning of the 8th, I found that only 17 oz., of a specific gravity of 1·014, had been voided during the twenty-four hours; that he had been delirious during the night, and that he had vomited a great deal. No urine having been passed for twelve hours, and a desire to micturate without the ability to do so being experienced, I had a catheter passed, when 28 oz. were drawn off of the same character as that of the preceding day. At 3.10 p.m. on this day he had general convulsions, which lasted for ten minutes. I saw him at 8 p.m.; he was then in a very stupid state—pupils widely dilated, skin cool and non-perspiring, pulse 120. Twenty-three ounces of urine were drawn off. Fearing that if the tubuli were not cleared of some of the numerous plugs which were choking them he would not fully regain consciousness, I prescribed the following diuretic:—Sp. æth. nitrosi, an ounce; potassæ nitratis, 40 grains; sp. juniperi, half an ounce; acetate of ammonia mixture to eight ounces. Two tablespoonfuls to be taken every sixth hour. At the same time counter-irritation was applied to the nape of the neck, a large sinapism to the loins, and copious drinks of slightly warmed water given. He had a very fair night, and at 1.0 on the morning of the 9th passed 14 oz. of urine by his own efforts; 18 oz. more were drawn off at 10 a.m. This was examined and found to contain large granular casts in immense numbers, and, as well, a large number of minute lozenge-shaped crystals of uric acid. The bowels acted slightly. He complained when I saw him in the afternoon of having "lost his senses." He had a vacuous, silly look; his sight, which I carefully tested, was unimpaired. Tongue large, moist, and white. No headache.

10th. Very restless all night; constantly crying out; passed water pretty freely with a motion, and twice had it drawn off. Takes his milk well. No headache; no vomiting; no paralysis. In consequence of his restlessness at night, a draught was prescribed, containing 10 grains of chloral and 20 of bromide of potassium. This did not compose him at all. He was again completely restless and very delirious. The bowels were opened several times during the night and day (the 11th). During the preceding twenty-four hours he had passed 49 oz. of urine; specific gravity, 1·011.

11th. Sixty grains of bromide of potassium in two ounces of water, to be given at bed-time.

12th. Had a very much quieter night. Night urine, 26 oz.; amount during the day not reckoned.

13th. Urine, 52 oz. (38 day, 14 night; specific gravity, 1·014). Sweat much in night, and is said to have had a rigor. Between 11 a.m. and 2.30 p.m. only 3 oz. of urine passed.

14th. Urine, 39 oz. (13 day, 26 night).

15th. Urine, 34 oz. (14 day, 20 night). An abundant rash over hands, arms, and face. Sweat profusely. Bowels opened three times.

16th. Urine, 32 oz. (10 day, 22 night).

17th. Urine nearly 12 oz. (10 day, less than 2 night; and it is thought about 6 oz. passed with last stool). The night urine alone was saved; it measured 13 drachms (about 42·8 c.c.); specific gravity, 1·014; urea only ·90 per cent. Four previous stools, but no urine with them; was very delirious during night. The rash is now universal; it is mainly papular, resembling lichen, except on the face, where it has not altered since the 2nd. Scattered over the body, however, are a great many minute pustules, each surrounded by an inflamed area; and on the first finger of the left hand and the third of the right, two collections of pus immediately beneath the epidermis, each of the diameter of a fourpenny-piece. These were opened, and the pus discharged.

18th. Very restless during night. Only 6 oz. of urine passed; specific gravity, 1·011. None all day; but constant action of the bowels, though but little passed each time, and that unmingled with urine. Many pustules similar to the two that were opened yesterday are forming, chiefly on the hands and feet.

19th. Urine increased in quantity: 24 oz. day, 10 night. Bowels still acting frequently. Vomited at tea-time yesterday, and retched several times afterwards. Face puffed.

The urine continued to be secreted in moderate quantity up to the 23rd, the amount of albumen and low specific gravity being, however, unaltered. Large superficial collections of pus continued to form in various parts, but chiefly still on the hands and feet. From two of these I obtained a drachm of thin pus, which I carefully examined for urea, as it seemed likely that an effort was being made on the part of the skin to eliminate some of those products which the kidneys failed to discharge, and that the amount of urea might be taken as an index of these. I found this to contain ·8 per cent. of urea. On the 24th it was noted that only 6 oz. of urine had been passed during the preceding twenty-four hours (including a small quantity voided at stool). He had had a very restless night, constantly crying out. He complained to me of cramps suddenly seizing his jaws and shutting them tightly, sometimes against his tongue, causing it to bleed, and at all times occasioning him much pain, whether the tongue were bitten or not. I had previously noticed blood on each side of his tongue, and learned from him now that the cramps caused him often to bite it, but that he was quite conscious all the time. He has continued to have the hot bath ever since the 9th, and for a short time after it he always sleeps quietly. The breathing was now noticed to be laboured and wheezing, the expiration particularly being prolonged and sibilant. The bases posteriorly were slightly dull, and the respiratory sounds there very faint. Moist sounds were heard over the lungs generally.

Sinapisms were applied to the chest, and ether and ammonia in infusion of senega given. The skin in the flexures of the thighs being denuded of epidermis and very painful, it was bathed with a warm, very diluted aqueous solution of carbolic acid (1 to 100), and then dusted with oxide of zinc and starch.

This at once gave relief. The lungs becoming more and more œdematous, dry cups were employed in addition to the sinapisms. Much frothy sputum was expectorated, tinged with blood. The respirations were 24; P. 80; T. 98, on March 1st, when he complained most of want of breath. The urine passed during the previous twenty-four hours amounted to only 14 oz. (about 420 c.c.); specific gravity, 1·014; acid, smoky; urea, ·99 per cent., *i.e.* 4·2 grammes (65 grains) of this substance was all that was passed. The albumen, though relatively very abundant, did not absolutely amount to much, the total weight being 4·39 grammes (about 68 grains). Microscopically examined, the urine was found to contain a considerable number of large granular casts, though fewer than on the 7th; a few large hyaline casts; free blood cells (red); no blood casts; cylindrical cells, probably from the pelvis; large so-called compound granulation cells; pus or white blood cells; much granular débris; bladder epithelium, with a granular aspect. On the evening of the 2nd he became unconscious, and died at 2 a.m. on the following morning, having been under treatment altogether forty days.

Autopsy. This was made fourteen hours after death. Rigor mortis was well established. There was much œdema confined to the lower extremities. A small quantity of the clear subcutaneous fluid was got by means of punctures, and examined for urea after separation of the albumen by heat and a drop of acetic acid. The reaction of the fluid was neutral. It contained ·32 per cent. of urea. The brain was examined before the other organs. This was done to avoid any loss of blood or other fluid from it. The sinuses contained but little blood, and there was scarcely any fluid in the ventricles (not [illegible]nt to allow of my making an analysis). The substance of the organ appeared healthy. It was not œdematous or soft, and did not look strikingly anæmic, though all who examined it thought it slightly so. The membranes were quite natural. To test the wetness or otherwise of the brain, 20 grammes of its substance, partly white and partly grey, were taken from the middle lobe, carefully dried for forty-eight hours, at 180° F., over sulphuric acid; then pulverised, and dried again in a similar manner until weight was no longer lost. The weight of the perfectly dried brain was 4·15 grammes. Its fluid, therefore, equalled 15·85 grammes, and the percentage proportions were 79·25 water and 20·75 solids, which agree almost exactly with those given by Lehmann* for normal brain, viz., 80 water and 20 solids. The cavity of the chest contained a good deal of clear fluid on each side. This had a specific gravity of 1·042, contained ·315 per cent. of urea; and 20 grammes yielded 1·065 gramme of albumen. The reaction of the fluid was distinctly acid. The pleuræ were free from thickening or adhesions. Both lungs were œdematous, but otherwise normal. No trace of tubercle. The heart was quite normal; it weighed 14½ oz.; its muscular tissue had every appearance of health. The left ventricle was not hypertrophied.

Liver normal, except at the left lower anterior margin, where it was yellow and denser than natural for a space of two or three square inches, the yellowness extending into, but not quite through, the thickness of the organ.

The mucous membrane of the stomach was much thickened, softened, and lined by a tenacious, closely adherent slime, which it was very difficult to wash off. The intestinal mucous membrane was also œdematous. There was no ulceration either of stomach or intestine, but the mucous membrane of each was much congested.

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* *Lehmann, Physiological Chemistry*, vol. iii. p. 117.

Spleen normal.

The kidneys were large, smooth, and soft. The right weighed 10 oz. and the left 7 oz. The capsule was not thickened, and came off from every part readily. The external surface was characterised by a pale—almost white—groundwork, over which a great number of stellate veins were scattered. There were no cysts visible. On a longitudinal section being made, the pyramids were seen to be very deeply congested; they were of a purple hue, and bled freely on the slightest pressure; the cortex, on the other hand, was unnaturally pale, and had the naked-eye appearance of that of the kidney of chronic parenchymatous nephritis. Scarcely any blood oozed from the surface of this portion when it was squeezed. Here and there were little red points, as large as the head of a small pin, which I thought would probably prove to be glomeruli distended by extravasated blood. On carefully removing specimens and examining them under low powers (Beck's $\frac{2}{3}$), I found that they consisted of a mass of convoluted capillaries, the calibres of which had been enormously increased; the outlines of the vessels were well marked, and the blood certainly was not extravasated.

Sections, when hardened and examined under higher powers, showed a very remarkable alteration in the glomeruli. Many of these were surrounded by a dense capsule, made up apparently of connective tissue corpuscles, of which latter many were also within them, the appearance being, I imagine, something like that which Klebs describes as characteristic of a variety of inflammation which he terms glomerulo-nephritis, [illegible]ich he describes as "an inflammatory overgrowth of that small modicum of connective tissue which holds the vascular loops of the glomeruli together;" the kind of inflammation which, in his opinion, may explain "the sudden and often absolute suppression of urine, the acute transudations and the rapidly fatal uræmia, which occur in the course of this disease." *

Bladder empty; its coats normal.

Blood was taken from the vena cava for examination. It did not form a proper clot. The specific gravity of the whole was 1·057. Twenty grammes, measuring 19 c.c., were gently heated on a water bath, at temperature of 110° F., nearly to dryness, and then treated with absolute alcohol, filtered, and the residue treated a second time with alcohol. The alcoholic extract, which yielded 64 c.c., yielded by Russell and West's process ·3 per cent. of urea, *i.e.* ·3 grammes in 100 c.c. In the 64 c.c. (or the 19 c.c. of blood) there was, therefore, ·192 gramme of urea, or 1·01 gramme in 100 c.c. of blood; that is to say, the blood contained 1 per cent. of urea.

There was no pus in any of the joints.

The case is interesting in several particulars. Firstly, it proves, beyond a doubt to my mind, that a kidney undistinguishable to the naked eye from that of chronic parenchymatous nephritis can result from acute scarlatinal nephritis. It shows, too, that this condition can be induced in a short space of time. Until the occurrence of sore throat this patient had been perfectly well. Three weeks later he came under my notice, suffering from scarlatinal nephritis, which, at the outside, could not have been established more than a week or ten days previously. Forty days later he died. In the course, therefore, of from six to seven weeks, the kidney had passed from its normal state to that of a typical large white kidney.

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* Rindfleisch, *Pathological Anatomy*, Syd. Soc.'s Translation, 1873, vol. ii. p. 152.

What appeared to be the compensatory action of the skin was strikingly manifested here. While the mere passive subcutaneous effusion contained but ·3 per cent. of urea, the thin purulent matter—the result, apparently, of an active inflammation set up in the sweat glands by the irritation of urinary products which they were attempting to eliminate in unusual quantities—contained no less than ·8 per cent., nearly as large a proportion as was found in the scanty urine of the same date. Indirectly this fact points to the immense importance of maintaining efficient action of the skin during acute or chronic diseases of the kidney. I have many times examined respectively the sweat, the watery discharges from the bowels, and the subcutaneous effusions so common in these affections, and while the two latter have been invariably very poor indeed in urea, the first has always contained a large proportion of that substance. Free perspiration, therefore, affords the most efficient physiological relief to the kidneys, at the same time that it serves indirectly to promote the absorption of effused products by drafting off from the blood a large quantity of fluid. This last result is brought about with much greater economy to the system than when diarrhœa is established; for the fluids that are discharged in this latter way are serous and contain a large proportion of albumen, while there is none of this material in the sweat, the matters discharged in which are wholly effete.

I have never seen any of those injurious effects from the disappearance of dropsy which Bartels once witnessed, and which he attributed to the re-absorption of poisonous materials held in solution in the subcutaneous effusion. The most that

I have observed after the rapid disappearance of dropsy has been headache, which I have always looked upon as probably resulting from suddenly altered conditions of blood pressure, and which, as I observe elsewhere, has, as a rule, been speedily relieved by warmth to the head and the exhibition of diffusible stimulants, such as ether or ammonia.

I have previously referred to the same author's opinion concerning the early alkalinity of albuminous urine. From a great many observations, extending over some years, I can positively assert that albuminous urine does not necessarily become quickly alkaline, if it was acid when passed, and care has been taken to collect it in a perfectly clean vessel.* It happens that I had for a long time been making observations with a view to determine the duration of, and changes in, the acidity of the urine, before the publication of Bartels' memoir, and I continued these with more of interest afterwards. Baker's case afforded a good example, among many others, of the incorrectness of the statement to which I have alluded. I took a portion of that which had been voided on February 11th. It was as highly albuminous as any urine I had ever examined. It was distinctly acid on the 12th, and again, day after day, up to the 20th. On that day a dense gelatinous layer was seen at the bottom of the bottle containing it, a portion of which, when it was brought up in a pipette, was found to be alkaline; though the entire urine, including the gelatinous deposit, when well shaken up, was still acid. Again, a very albuminous urine from another patient was passed on February 19th. It was acid on the 20th, and every day up to and including the 25th. A male—chronic parenchymatous nephritis; urine very albuminous; a portion of the twenty-four hours' urine passed on October 5th, 1877, quite acid on October 6th. Female—urine acid on October 30th; passed on October 29th. Male—urine very albuminous, becoming nearly solid when boiled; acid when passed on the 12th, still acid on the afternoon of the 13th. These illustrations will be sufficient to show the incorrectness of Bartels' statement.

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* See remarks on "Care in Collecting the Urine," p. 9.

Another point illustrated by Baker's case is the absolute necessity of guarding the subject of Bright's disease in every possible way against the least accidental cold. His unfortunate journey, directly contrary to my directions (which had been more than ordinarily explicit as to his method of conveyance), down the stone steps of the hospital, while his feet were only covered by his stockings, was followed by, if it did not cause, an immediate aggravation of symptoms. It was only after that that the enormous number of granular casts made their appearance. Previously, as I have stated, these were few in number, and the patient appeared to be progressing on the whole favourably, the vomiting having ceased and the urine increased in quantity. Whether it was at that time that an interstitial nephritis was induced, and, the inflammatory products laying their deadly grip upon the glomeruli, and the tubuli not being efficiently flushed and becoming choked,* a more serious uræmia was caused, must be matter of conjecture.

Again and again examination of the expired air was made, but no indication of ammonia could be obtained.

The order of the uræmic symptoms was as follows:—Firstly, obstinate vomiting; then a sensation as of numbness; later still a condition as of semi-consciousness and a feeling which he described as "very strange" and "quite childish"; then an attack of general convulsions; and following, rather than preceding, those, as it more generally does, the tetanic closure of his jaws, attended often with biting of the tongue.

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* Dr. R. Southey adduces reasons for doubting the flushing function of the glomeruli.

The next case, although, like that of Baker, attended by uræmic convulsions, recovered.

CASE 2.—ACUTE NEPHRITIS, PNEUMONIA, URÆMIA, SUPPRESSION, CONVULSIONS, RECOVERY.

Phœbe H., aged 21, married, was admitted into the Royal Southern Hospital, under my care, on October 21st, 1876, in a semi-conscious and apparently almost dying condition. From her husband, who accompanied her, the following account was obtained. She seemed to be quite well up to the 14th; but having on that day washed her head, and, while the hair was yet damp, exposed herself to the cold air, she became chilled. Her feet and face then swelled, the urine became scanty, and on the 20th, after complaining of headache, she was suddenly seized with a severe epileptic attack, which was followed in quick succession by three others. Between these seizures she retched violently. The tongue was bitten, and consciousness had not been properly regained at the time of her admission on the day following. Dr. R. Williams, who had seen her previously to her having been brought in, fully confirmed the husband's account. On admission she was in an extremely stupid condition, not speaking unless spoken to, and then merely giving a very short reply some time after the question had been put. The face and feet were somewhat swollen. The skin felt hot and was dry. Temperature, 101·6° F. The lips were dry and the breath offensive;

but the tongue was very moist and of an almost purple hue. The pupils were neither contracted nor dilated. Sinapism to nape of neck and to loins. R. mist. ammoniæ acetatis, an ounce every fourth hour, each dose to be followed by a warm drink of milk and water. Milk diet. To lie between blankets.

22nd. Has had diarrhœa all night. No vomiting. Is very stupid; apparently more so than yesterday. Pupils contracted. No fumes of ammonium chloride are generated when a glass rod, dipped in hydrochloric acid, is held before her mouth so as to receive the breath. Temperature at 11.30, 100·4° F.; at 3.30 p.m. 100° F. Pulse at latter hour, 128—very weak. Respirations, 50. No urine could be saved in consequence of the diarrhœa, but very little appeared to have been passed. The stupor becoming deeper, emp. cantharidis was applied to the nape of the neck over tissue paper. Four grains of carbonate of ammonia to be added to each dose of the mixture.

23rd. Blister rose very well. She is now conscious; has retched several times during the morning. There is great lividity of the face, lips, and fingers; the nails are quite blue. She is spitting a somewhat diffluent matter, stained with bright blood. Tongue large, white, wet. Temperature, 97·4° F. Pulse small—very rapid. Heart's sounds natural. Decubitus left lateral. Respiration hurried. Dullness over anterior part of left chest, at base. Percussion note at all other parts, back and front, quite clear. Respiration all but suppressed over dull part. Left pupil dilated. Sinapism to left chest. A teaspoonful of brandy in soda-water every hour.

24th. Vomiting ceased yesterday evening. Lividity and other signs and symptoms, as on the 23rd. Mostly inclines towards right side now. Temperature, 99·8° F. Respiration extremely hurried.

25th. Did not sleep during night. Respirations, 66 while sleeping at 1.30 p.m. Pulse slightly improved. Bowels opened loosely three times; a small quantity of urine passed each time, but could not be saved. Temperature—Morning, 98·3° F; evening, 99° F. Continue medicines. Dry cupping to loins, to be followed by hot linseed-meal poultices.

26th. Better. Lips redder. Pulse, 144. Respirations, 60. Lying now on left side, with the head low. Temperature—evening, 101° F. Urine has been passed, and contains much blood. Dry cupping and poultices to be continued.

27th. Better. Still diarrhœa, though less severe. Crepitation heard at upper part of left lung anteriorly. Pulse, 132. The urine has been decidedly increased in quantity since the dry cupping. From this date all the symptoms improved. The urine became less and less bloody, till, on the 1st, it assumed its normal properties, neither blood nor albumen being any longer present. She got up on the 3rd, and, being very anxious to return to her home, was discharged cured on the 6th.

The above case was exceedingly severe. The suppression of urine for many hours was complete; and, when urine was passed, it was at first very scanty, and contained a large proportion of blood. The semi-comatose condition passed away as the urinary secretion became re-established. Then right pneumonia supervened. This, however, in turn was subdued. No attempt was made to check the diarrhœa, which was regarded as conservative. The treatment explains itself. The blistering fluid was not applied to the neck until mustard had been used in vain, and the unconsciousness was obviously becoming deepened.

The above is the kind of case, which, if there be no strong countervailing reasons, is likely to be benefited by free blood-letting. I have several times seen the symptoms clear away, and consciousness temporarily or permanently restored as the blood flowed, in the coma of acute renal disease, and in the early stage of cirrhotic kidney. Thus, in the case of a gentleman who was brought into the Royal Southern Hospital on December 2nd, 1876, in the terrible condition known as the status epilepticus, when death seemed imminent, one fit succeeding another every fifteen minutes, with profound intervening coma, after counter irritants to the neck and loins, the injection of bromide of potassium into the bowels, and the inhalation of nitrite of amyl proved of no avail, consciousness was restored as blood flowed from the arm, and he was able to converse with his wife and give directions concerning the future. Ultimately, however, he sank, one of the kidneys on examination being found occupied in a great portion of its extent by a large cyst; and the urine retained in the bladder having a much larger proportion of albumen than is common when no kidney disease had existed during life. Again, in a case which I saw with Dr. Wilson Steele, in September, 1876, of a stout woman in a state of deep coma, with recurring eclamptic attacks, the urine being highly albuminous, consciousness was recovered without any recurrence of bad symptoms shortly after the free abstraction of blood, the patient completely recovering. Other examples will be given of the practice by-and-by; but in the case now under notice I was deterred from blood-letting by the following consideration. For some time previous to the onset of the attack, the patient had been living very poorly indeed, and had been obliged to dispose of almost every article of furniture and clothing, during her husband's loss of work, in order to provide what scanty food she had been able to obtain. She was, therefore, much reduced, and I dreaded the effect of even a small abstraction of blood. The kidneys were, however, directly relieved by a small spontaneous hœmorrhage; and certainly under no modification of condition could the recovery have been more complete than it was.

CASE 3.—PROLONGED DROPSY AFTER SCARLATINA IN AN ADULT, ANÆMIA, RECOVERY.

James Jones was admitted into the Royal Southern Hospital under my care on February 5th, 1877, suffering from anasarca. He gave the following history. Some weeks ago while engaged at his work as a rope-maker, he thought that he had caught cold, and had much pain across the loins and the back of the head. Directly after this, his feet and legs began to swell, and later on, the abdomen. He remarked also that the eyelids were puffed, especially in the mornings. He has not had to rise in the night to make water. He has not perspired since the commencement of his illness. On further questioning the patient it was found that about two months ago a child had had scarlatina in the house in which he was living, and that at the same time he himself had complained of slight sore throat, but that he had had no rash. There was no cardiac enlargement. The bowels generally were confined. Beneath the angle of the right side of the lower jaw were the cicatrices of what had probably been scrofulous abscesses. He was pale, and felt weak and unable to work.

The urine was found to be rather abundant in quantity, 34 oz. being passed in the first twelve hours, of a pale straw colour, and throwing down a light flour-like deposit. When examined microscopically, it was found to contain blood discs, and a number of very small purely hyaline casts. There were no crystals in the deposit. The reaction was faintly acid; specific gravity 1·016. It contained a very large quantity of albumen, as much as two-thirds of the tube being occupied by this.

It was thought advisable to treat the case at first as though it were still in the acute stage. Mustard poultices were therefore directed to be applied to the loins. The sheets were removed, and the blankets well warmed; acetate of ammonia mixture, followed by hot milk and water administered every fourth hour, and the hot air bath employed. To relieve the constipation, 40 grs. of compound jalap powder were prescribed twice or three times a week. The patient was desired to remain in bed, and an exclusively milk diet was ordered. For the first two nights there was no perspiration. On the third it was abundant. The urine then began to flow even more freely than at first, and by the 16th all trace of œdema had disappeared. The following mixture was then substituted for the one he had been taking:—Citrate of iron, gr. 40; citric acid, gr. 40; liq. ammoniæ citratis, 4 oz.; aquæ, 4 oz. Two tablespoonfuls three times daily. Diet as before. The amount of urine voided daily varied from 36 to 60 oz., and its specific gravity from 1·016 to 1·010. There was a marked general improvement in the patient's condition, but the amount of albumen was scarcely less than it was when he was first admitted. On the 5th of March, therefore, 7 grs. of gallic acid, in a few days increased to 10 grs., were prescribed for him three times a day, in addition to his other medicine. The albumen began almost immediately to diminish. On the 8th, as he complained of much lumbar pain, the loins were dry cupped. The gallic acid and the citrate of iron mixture, with the occasional employment of the compound jalap powder either alone or with the addition of the compound elaterium powder, were continued until his dismissal. The albumen steadily diminished; his general condition improved; his weight and strength increased; and at length, after a little over three months' treatment, he was discharged, to all outward appearance well.

This case illustrates the advantage of a steady perseverance in an astringent and tonic treatment. The man was very ill when admitted; and, what was most unfortunate, had continued ill for seven weeks before he was subjected to efficient treatment, during which time the abnormal condition of the kidney was becoming more and more firmly established. Though the dropsy rapidly disappeared under treatment, yet for the first month there was scarcely any perceptible decrease in the amount of albumen. Gallic acid was then given, and it began at once to diminish; and two months' continued employment of this drug, at first in 7, and later on in 10 gr. doses, was followed by its almost complete disappearance from the urine, and the entire disappearance of the small hyaline casts. The iron in the form mentioned, the occasional use of purgatives, and of the hot air bath, together with a strict adherence to a milk diet, formed also elements in the treatment. There was still a slight trace of albumen in the urine when the patient left the hospital. It would have been more satisfactory if he could have been kept in until even this had disappeared: pressure on our space, however, rendered this at the time impossible. But as the warm weather was commencing, there was less risk attending his discharge than there would have been at the beginning of winter.

This is the kind of case in which gallic acid is especially serviceable. In the earliest acute stage it is inapplicable. Where there is a very large quantity of urine voided, with little or no albumen, as in granular degeneration, it is also useless. Immediately after the acute stage of an acute attack has passed over, however, and when there is an entire absence of fever and dropsy, and where the amount of urine is still larger than natural and the albumen considerable, its administration in from 5 to 10 grain doses is sometimes followed by very good results; though at others, it must be confessed (in those presumably where the structural change in the kidney is more advanced), it does not seem to exert any beneficial effect.

In what way it acts is not quite so clear as would at first sight appear. Scarcely a trace of it appears in the urine. After a patient has been taking 10 grs. three times a day for many days there will be only a faint reaction on adding a solution of a per-salt of iron to his urine; not nearly so decided a change as will be produced by acting on an equal quantity of healthy urine to which two drops of tincture of gall have been added. Yet there is a reaction, even though but a faint one, indicating the passage of unchanged gallic acid through the kidneys, and probably the local action of the drug during the process of elimination checks the draining away of the albumen. But though it certainly checks the discharge of albumen, it does not diminish the flow of urine. During the whole time of taking it by Jones, the amount voided daily varied from 60 to 80 oz.

CASE 4.—ACUTE DROPSY FOLLOWING SLEEPING IN A DAMP BED, RECOVERY.

Elizabeth Diarmid, aged 40, admitted into the Victoria Ward, Royal Southern Hospital, October 20th, 1874, states that she considered herself in good health until eight days ago, when she began to suffer from pains in her loins, and noticed that she passed but little water, which was of a very high colour. The night but one previously she had slept in a damp bed, and attributed the pains in the back and her present illness to that circumstance. The day after the commencement of her lumbar pains her face and legs began to swell, and her breathing became very short. On admission she was found to be the subject of great anasarca. The skin was everywhere œdematous, that of the face, though swelled, presenting, however, a ruddy, healthy hue. The integuments over the legs were tightly stretched and glistening from the amount of effusion. She was unable to lie on the left side. The breathing was short and she was troubled with occasional cough. The bases of both chests were dull, but the amount of effusion was not great. The heart's sounds were normal and the apex beat not displaced. The digestive functions were natural and the bowels regular. The urine was still scanty, though less so than it had been, and high coloured. When first examined, its specific gravity was 1·010; it was acid, and contained a very large amount of albumen. Microscopically it presented a few blood casts. This had all the appearance of being a case of acute parenchymatous inflammation of the kidneys, uncomplicated by any other affection. The healthy hue of the patient's face gave support to her statement that until the sudden accession of the present disease she was quite well. She was placed in a warm part of the ward, between the blankets of a bed that had been previously warmed, put upon a milk diet, and ordered the mixture of acetate of ammonia every third hour, and half a drachm of pulv. jalapæ co. on the following morning. The quantity of urine voided soon became increased. On the 22nd there were 38 oz. On the 24th the compound jalap powder was repeated, and the bowels freely acted on, all other treatment being continued. On the following day 3305·5 c.c. (110 oz.), and on the 26th 3065·1 c.c. (102 oz.), of urine were passed, of a very low specific gravity (1·006), and presenting but the faintest trace of albumen. By the end of this day the œdema of the legs had entirely disappeared, and the patient expressed herself as feeling very much more comfortable than on any day since her illness had commenced. The breathing was very much less short, and she could sleep without discomfort. The increased flow still continued, and during the 27th 4207 c.c. (140 oz.) were passed, the specific gravity being 1·007, and the albumen scarcely detectable. She had slept well during the night, and had no pains in the loins or chest, but began to experience slight pains in the head. A complaint of this sort—*i.e.*, of pains in the head—is very common after a greatly increased flow of urine has been maintained for two or three days; but it, for the most part, speedily passes off without treatment, or is relieved by the application of heat to the head, or a dose or two of a rapidly diffusible stimulant, such as ether in camphor mixture. On the 28th, 2524·2 c.c. (84 oz.) were passed; and as the patient had been for several days entirely free from dropsy, and was feeling weak, tonic treatment was now commenced, 1 gr. of quinine and 15 m. of tinct. ferri sesquichloridi being administered in an ounce of water three times a day. The urine at once became diminished, but, concurrently with this diminution, very severe diarrhœa, lasting for two days, occurred, during which the temperature rose to 104·4°, though the pulse remained at 88. By the 5th of November the diarrhœa had entirely subsided, and she felt pretty well. For some days the quantity of urine voided continued rather more than normal, ranging between 3005 and 2103 c.c. (100 and

70 oz.); after which it began gradually to lessen; and, as the patient felt quite well and was anxious to leave, she was discharged on the 14th of November.

It would have been more satisfactory to me to have retained her in the house for another month or six weeks, during which time I should have persevered with the use of the tincture of sesquichloride of iron. By the end of that time the amount of the urine voided would probably have been no more than natural, and its colour and specific gravity increased. For some time after acute congestion or inflammation of the kidney, with the consequent scanty flow of urine, has been subdued, the amount voided daily continues to be in excess of what it should be. By degrees, however, and especially under the persistent use of iron, the quantity falls, and the normal properties of the urine are restored. It has always appeared to me very desirable to encourage patients to persevere with treatment until these changes have been effected, and not to be satisfied with the mere disappearance of the dropsy, and then at once to recur to their usual mode of living. It is not always easy, however, to persuade them to submit to any further restriction after they have endured those rendered necessary by the acute attack. This case was an illustration of the difficulty. The patient felt herself well and wanted to leave, though she was passing 75 oz. of urine daily of a specific gravity of only 1·005. All that could be done, therefore, was to advise her to live very simply on a plain, nutritious diet, without stimulants; to wear flannel next the skin; and to continue her medicine for some time.

As a proof (if such be wanting) that the kidney remains peculiarly susceptible to derangements, even for a long time after the urine has apparently regained its normal character, I may mention not merely the fact that blood extractives, recognisable by the *immediate* deposition of a somewhat dense precipitate on the addition of gallic acid to the cold urine, continue to drain away when no albumen can be detected by the ordinary tests ; but also the following case.

CASE 5.

Miss M. B. was attacked with scarlet fever in April, 1878. The disease being very severe, I saw her many times in consultation with the late Dr. Andrews, of Walton. The urine had remained free from albumen up to the time when I ceased my visits ; but, as I subsequently learned from Dr. Andrews, anasarca occurred at a later stage, with scanty albuminous urine. This entirely disappeared, and the patient having continued free from dropsy, and the urine having been apparently normal for some time, she was sent away to a watering-place, with her nurse, for change of air. A few days after returning home some weeks later, she again became ill of small-pox, which had been contracted at this watering-place. The attack was not very severe, but at the outset of the primary fever the urine presented a most extraordinary appearance. It was almost black, very thick, and looked much like the loose motion of a person who had been taking iron ;—a great number of large thin loose flakes of a deep brownish-black colour being diffused through a turbid brown liquid. So much was it like an intestinal motion that we had every possible precaution taken to prevent any admixture with what was next voided. This, however, was precisely similar. On examination it turned out not to have blood, casts, or albumen. Counter-irritation was applied to the loins, followed by linseed-meal poultices, frequent diluents were given, with diaphoretic medicines, and in a few days the urine resumed its normal appearance and characters, which were not disturbed during the slight secondary fever which accompanied the maturation of the pustules.

Such cases show the special susceptibilities of the kidneys to become disordered after they have once been the subject of any serious inflammatory attack; and they prove how necessary it is, long after complete health has apparently been regained, to maintain the utmost watchfulness against conditions that would be likely to affect them. Cold, wet, alcoholic stimulants, and—much more than is apparently thought necessary—the breathing of an impure atmosphere by attending crowded meetings, should be studiously avoided for many months; or attacks may be re-induced, slight at first, but each one more severe than its predecessor, which, slowly and insidiously, but very surely, will induce serious organic disease.

This necessity for long continued care cannot be too strongly insisted upon. The man who has had an unmistakeable attack of nephritis ought not to consider himself free from risk for at least many months, and, perhaps, it would not be too much to say for a year, after the urine has apparently regained its normal composition and quantity. If an English winter and spring have been lived through without any sign of ill health, recovery has probably been completed. It is by no means uncommon to meet with cases in hospital of patients admitted with anasarca, who, being questioned, say that they had been the subjects of a similar attack months, or it may be a year or two, previously; that they had been engaged in their usual occupations, to all appearance perfectly well in the interval; but that some indiscretion, such as over indulgence in drink or exposure to cold, had re-induced it.

CASE 6.—ACUTE DROPSY AFTER EXPOSURE TO A PROLONGED WETTING, PNEUMONIA, ŒDEMA OF THE GLOTTIS, ABSCESS OF RIGHT HAM, RECOVERY.

The following case is interesting in several particulars; for not only was the patient in a state of very urgent danger when brought in, owing to the supervention of acute pneumonia, which complicated his renal disease, but, within a short time afterwards, there was added œdema of the glottis—one of the most fatal, but, happily, perhaps least common, of the complications of that affection.

William J. Fuller, a seaman, aged 35, was brought into the Royal Southern Hospital, and placed under my care, on March 8th, 1876. He was too ill to give a complete history of his case at the time; but a few days subsequently I learned, partly from himself and partly from his sister, who had been hastily summoned, the following particulars:—He had led a roving life, but had never been a heavy drinker. He had had rheumatic fever three or four times; the last time being two and a half years ago, when he was at Venice. Since the first attack, which occurred during his boyhood, he had been believed to be the subject of heart disease. While serving on the West Coast of Africa, he had had the fever of the district, but the paroxysms of heat and cold did not recur at any regular intervals. His health had been seriously impaired by these illnesses. The day before his admission he had vomited several times, and immediately after coming in he had a rather severe rigor. The present attack is attributed to his having got very wet about a month ago. He then caught a severe cold, and shortly afterwards perceived that he passed but very little water, and that what he did pass was deeply coloured. Swelling, commencing in his feet and extending upwards, then came on, and a little later he experienced great difficulty in breathing. When admitted he was very dropsical. The legs, besides being extremely œdematous, were much inflamed. He was breathing rapidly and with great difficulty; so much so, that a complete examination was impossible. By inclining him to one side, however, it was ascertained that the base of the left lung was dull and the breath sounds suppressed. The heart sounds were muffled, but no murmur was then audible. His pulse was 106, fluttering; temperature, 103° F.; he had a short hacking cough, and expectorated matter of a deep prune juice colour. The urine passed first after his admission was smoky, acid; specific gravity, 1·012, and highly albuminous. After standing some time, a dingy reddish brown precipitate was found, which contained numerous blood casts and free blood cells, and gave an immediate reaction with the guaiacum test for blood. There were also a few pus cells; and, besides the blood, some epithelial casts. A portion of this urine was examined in the following way:—5 c.c. were evaporated to dryness in a platinum capsule, and the residue dried at 200° F., till it ceased to lose weight, and weighed. It was then incinerated at a red heat. The total solids amounted to ·168 gramme, of which ·145 gramme was organic and only ·023 inorganic. The quantity of urine was not ascertained, but the proportion of the inorganic to the organic was shown to be a very abnormal one, being as 1 : 6·3, instead of 1 : 2, as it is in health. Much of this disproportion was occasioned by the very large quantity of albumen present. The following treatment was ordered:—The patient to be placed in a bed near the fire. A large sinapism to be applied to the left chest. The loins to be cupped to 8 oz., and subsequently poulticed. The mistura ammoniæ acetatis, 1 oz. every fourth hour, each dose to be followed by a warm drink, and abundance of warm milk to be given. On the 9th the urine was still scanty. During the night he was seized with suffocative dyspnœa, and the breathing became laryngeal. Hot poultices were at once applied to the throat, and the conium inhalation ordered and persevered with, and 15 minims of vin. antim. tart. added to each dose of his mixture. This relieved him, but for two days the symptoms of œdema of the glottis were such as to occasion great anxiety. The temperature fell on the 9th to 98·8° in the morning, rising to 100·2° in the evening; pulse, 90 and 92. On the afternoon of this day a sphygmographic tracing was taken of the left radial under a pressure of 402. The character of this obviously showed that there was no great increase in arterial tension, and corroborated the opinion formed from the appearance of the casts, that the renal disease was of recent origin, and that if the accompanying affections could be subdued, the kidneys might recover their integrity.

10th. Urine increased in quantity—24 oz. in twelve hours; specific gravity, 1·013; acid, still containing much albumen and blood, but less smoky than previously. Patient has had a fair night, and feels much easier. Bowels not acting sufficiently, notwithstanding that a saturated solution of bitartrate of potash was given for a drink yesterday. To have in addition 30 grs. of compound jalap powder, and to be submitted to the hot air bath. Temperature and pulse—Morning, 98·6° and 96; evening, 99·2° and 80; respirations constant at 20.

11th. Slept fairly last night; bowels opened three times by powder; motions liquid. Perspired very freely in the hot-air bath. Urine much increased in quantity, but could not be measured, as much of it was passed at stool. Temperature and pulse, 98·5° and 79 morning; 99·8° and 80 evening; respirations, 20.

12th. Much better. Had two loose motions during the night. 30 oz. of urine passed during the twelve hours, in addition to what was voided at stool. Temperature and pulse, 99° and 96 morning; 101° and 72 evening.

13th. Two loose motions during night. 42 oz. of urine voided during twelve hours; specific gravity, 1·014. He is hoarse, and complains of soreness of throat. On examination the posterior surface of the pharynx was seen to be deeply injected, and a streak of blood to lie across it. Uvula very long and relaxed. Semi-solid gelatinous sputum streaked with blood. This evidently came from the pharynx. Temperature and pulse the same as yesterday. A solution of nitrate of silver, gr. 4 to the ounce, was ordered to be used as a spray to the throat, and the liniment of iodine to be applied externally; and as the temperature had risen for two nights, 2 gr. of quinine were ordered in pill night and morning. Other treatment to be continued.

14th. Better. 72 oz. of urine during the twenty-four hours; specific gravity, 1·016; acid.

15th. Throat much better; bowels opened twice during night. Urine, 62 oz. in twenty-four hours, in addition to what was voided at stool; specific gravity, 1·012; acid. The œdema of the legs was now rapidly subsiding. The left continued, however, to be red and inflamed, and there was pain on moving it. A careful examination showed commencing suppuration in the left ham.

16th. Urine, 67 oz. in twenty-four hours; specific gravity, 1·011. Bowels acted once. Pulv. jalap co. gr. xxv. Hot-air bath.

17th. Urine, 93 oz. in twenty-four hours; specific gravity, 1·010. Bowels opened twice by powder. Not much sweating in bath.

18th. Urine, 74 oz.; still slightly smoky; specific gravity, 1·013. Bowels opened three times. Slept well. Now, for the first time, a distinct soft systolic murmur heard at the apex. Omit. mist. R. Inf. digitalis ½ oz. three times daily.

19th. Urine, 84 oz.; specific gravity, 1·010.

20th. Urine, 84 oz.; specific gravity, 1·010. The abscess in the left ham was opened, and a considerable quantity of pus evacuated.

The urine continued to flow in large quantities, 98, 103, 84, 96, 98, and 100 oz. being voided during the next six days respectively; and, what is not at all unusual under such circumstances, rather severe headache was complained of. On the 27th, 5 grains of citrate of iron were added to each dose of the mixture. He progressed favourably, and on April 13th, after having been up and fairly well for a fortnight, was sent to the Woolton Convalescent Hospital. From four to five pints of urine were still being secreted daily, with a specific gravity of from 1·015 to 1·013, and the faintest possible trace of albumen. On May the 30th he called at the hospital to report himself. He then looked and felt quite well, was free from swelling, and passing but a moderate quantity of urine daily.

In order not to complicate the history of the case, I have not introduced into it detailed statements of the examinations of the urine. This secretion was at first very scanty, only 4 oz. being voided during the night of the 9th. Like that passed immediately after his admission, it was very smoky and threw down a deposit consisting of blood and pus cells, with a few crystals of the triple phosphate, and some blood casts.

On the 11th, when the urine was secreted rather more freely, an examination similar to that of the 9th was made. 10 oz. (300·5 c.c.) were passed in 12 hours. This had a specific gravity of 1·013, contained 2 per cent. of urea, and contained also, before the separation of the albumen, 8·22 grammes (127·41 grains) of total solids, of which 1·02 gramme (15·81 grains) were inorganic, and 7·2 grammes (111·6 grains) organic, the ratio of the inorganic to organic being as 1 : 8. A second portion of 5 c.c. was taken, and, the albumen having been separated by boiling, after the addition of a few drops of acetic acid, treated as previously described. It was then found to contain a proportion of total solids, which, for the whole 10 oz., would have amounted to 7·8 grammes (120·9 grains). The difference between this and the amount obtained before separating the albumen showed that the quantity of this substance contained in the 10 oz. of urine amounted to ·42 gramme (6·51 grains). The amount of inorganic matter was found on a second incineration and weighing to be precisely the same as at the first, a result which gave confidence in the accuracy of the method. This was ·017 gramme in 5 c.c. The total inorganic, or 1·02 gramme, was to the total organic, now that the albumen was removed, in the ratio of 1 : 6·5 instead of 1 : 8, a fact which pointed to a large elimination of the proper urinary solids. Of the 102·3 grains of total organic matter obtained after the separation of the albumen, 93 grains consisted of urea, and 9·3 of other organic constituents.

Another examination of a similar kind was made some days later, when the secretion was much increased. Thus, on the 15th, when 72 oz. (2163·6 c.c.) were passed, having a specific gravity of 1·016, there were 53·463 grammes (or 726·33 grains) total organic constituents, including albumen, of which 561·25 grains were urea. The inorganic constituents amounted to 6·608 grammes (102·34 grains). The ratio of the salts to the organic constituents was therefore as 1 : 7. If the proportion of albumen was the same as on the preceding examination, viz., 6·51 grs. to 10 oz., this would have given 46·8 grs. for the day. Microscopic examination of the deposit at this time showed marked improvement. The casts were fewer in number. They showed no indication of a degeneration of the epithelial cell, and the number of blood corpuscles was manifestly lessened, and there was far less shedding of epithelium; so that I felt warranted in anticipating, and expressing to the friends the anticipation of, complete recovery, as the pneumonia and œdema glottidis were subdued: an anticipation which events proved to be not unfounded.

CASE 7.—ACUTE DROPSY FROM EXPOSURE AFTER CHILDBIRTH. RECOVERY FROM THE DROPSY. DEATH SOME TIME LATER FROM PERFORATION OF INTESTINE.

Perhaps the most dangerous and intractable of the acute inflammations of the kidney are those which are induced in the mother soon after confinement. Certainly some of the worst cases that I have seen have come on under such circumstances. Happily, though very severe they are not necessarily fatal, for I have witnessed recovery from the severest and most prolonged uræmic convulsions, which had succeeded a dropsy setting in five or six weeks after delivery. I am induced, however, to select the following case for description, because of the extreme rarity of the cause of death, as a consequence of renal disease —if, indeed, in the few cases where it occurs, it can be held to be a consequence and not an accidental sequence.

Elizabeth Kirkham, aged 34, was admitted into the Victoria Ward, Royal Southern Hospital, on November 17th, 1875, suffering from general dropsy. Three weeks before admission, while attending the funeral of her infant, on a cold day, she had been seized with chills. These were followed by severe cough, and after a day or two by swelling of her feet and legs, then of the abdomen, and lastly of the hands, arms and face. With the swelling she experienced pains in the loins, and observed that the urine became very scanty, of a high colour, and that it was not clear. On admission she was enormously swollen. The features were pale and puffed, the sclerotics of an extremely clear blue-white, and the eyes surrounded by dark areolæ. The breath was very short, and she was harassed by an incessant cough, every effort at coughing being attended by some pain between the shoulders. On examining the left chest it was found to be dull anteriorly to the level of the fifth rib as she lay on her back, the dulness rising as high as the fourth rib when she sat up. The breath sounds were feeble over the area of dulness; but there was no œgophony, nor was amphoric resonance observable at the apex of the dull side. The heart's action was excited; pulse 104 of natural volume. T. 98·6°.

She was placed between blankets in a bed near the fire; acetate of ammonia mixture was ordered to be given every fourth hour, each dose to be followed by a drink of warm milk and water. Immediately after taking one of the evening doses, she was to have a hot air bath; and on the following morning a dose of compound jalap powder was to be administered. Her diet was to be exclusively of milk, bread, and light milk puddings, such as sago, tapioca, arrowroot, &c.

18th.—The bowels had acted three times, and she had perspired freely from the use of the bath. The urine, of which only 14 ounces had been passed since the previous day, was clear, pale, acid, specific gravity 1·008, and very albuminous. The pain in the loins, shortness of breath, and dropsy seemed about the same. All the treatment to be continued with the exception of the compound jalap powder.

19th.—Passed 57 ounces of urine in the 24 hours; the bowels have acted once freely.

The kidneys now began to act very freely. The daily quantity of urine voided ranged from 60 to 90 oz., on one day reaching 122 oz., its specific gravity ranging, according to the quantity passed, from 1·007 to 1·016. The course of the case was as follows. With the increased flow of urine the dropsy quickly disappeared, and the left chest became clear to percussion. The quantity of albumen became less and less until November 25th, when it was barely detectable. The treatment by hot-air baths, occasional hydragogue purgatives, and diaphoretics and rigid dieting was continued until the 22nd, when, as she was quite free from dropsy, the tincture of the sesquichloride of iron was administered in doses of 15m. three times daily, the milk diet being still continued, and the patient kept in bed. Occasionally the quantity of urea eliminated was determined. Thus, on December 1st, when 2524 c.c. (84 oz.) of urine was voided, there was found to be 1 per cent. of this compound present, which, considering the amount of urine passed, was a fair quantity, amounting to 25·24 grammes, or 389 grains. On the 3rd of December the faintest trace of albumen was detectable. The use of the iron was continued all through December and January: 10 minims of the liquid extract of ergot being added on January 1st; but this being omitted and 1 grain of sulphate of quinine substituted for it on the 17th. The ergot did not appear to exercise any effect on the quantity of urine, which continued to be more than normal up to the 2nd of February, on some days reaching nearly 100 oz., and once 122 oz. Except for this excretion of an abnormal quantity of urine the patient had been for a long time well, and would have been dismissed. However, the fact that so large an amount was being passed, and the fear that, while such was the case, there would be risk from exposure to the cold of winter, led to her being kept in, when an altogether unexpected result unhappily caused her death, and gave us an opportunity of examining the organs both generally and microscopically. On the 19th of January, and again on the 24th, she complained of pain in the stomach after eating or drinking, to relieve which a mixture, containing diluted hydrocyanic acid and bismuth, was prescribed. Things went on well until the 2nd of February, when she had a rigor, and the temperature rose to 104·6° F., the pulse being 122. The tongue was clean; there was no vomiting, diarrhœa or pain, and the chest sounds were quite normal. As soon as the urine could be obtained it was found to be slightly alkaline, to have a specific gravity of 1·016, and to contain a very slight trace of albumen. After a dose or two of an acetate of ammonia mixture the temperature fell to 102·8° on the evening of the day of the rigor. On the morning of the 4th it was 102·6°, and in the evening 103·8°, the urine voided during the day being 38 oz. On the day following only 6 ounces were passed. Specific gravity, 1·025; faintly acid, and containing a very slight deposit of urates. I examined the urine for urea, and found 3·9 per cent. passed, or 5·4 grammes (84 grains) in the 24 hours. This showed a very considerable diminution in the amount of the chief of the solid urinary constituents, and I became alarmed for her condition. The head was aching intensely, the face much flushed, the tongue red but not dry; there was no appetite, and the temperature when I saw her at 2.30 p.m. was 104·4°. In the morning it had been 102·8°, and in the evening it declined from its midday amount to 103·4°. Careful inspection was made of the skin for spots, but none were discoverable. Microscopical examination of the urine showed here and there a granular fatty cast, crystals of triple phosphate, bladder epithelium, and a few scattered pus cells. A mustard plaster to the back of the neck relieved the headache. The hot-air bath was again used, and the loins were dry cupped. On the 6th the menses, which had been absent for many months, reappeared. More urine was passed, but it was not measured; the temperature, however, was still high: morning, 102·4°; evening, 103·6°. On the 7th the tongue was extremely sore and red; so sore indeed that she did not like to take milk or anything else in consequence of it. On the 11th she had for the first time complained of a feeling of pain in the abdomen, and vomited a little fluid; but on my examining her at the midday visit, she said that no inconvenience was caused by the pressure of the hand. There had been no looseness of the bowels at any time, with the exception of the two stools on the night of the 4th. She passed a good night on the 11th, but on the 12th sat up and washed her face, and shortly after fell back in a state of collapse. I saw her in that condition at 2 p.m., when she was dying, obviously from peritonitis.

A post-mortem examination was made 40 hours after death, of which the following is a report. The heart and lungs were healthy. On the abdominal cavity being opened, the small intestines were seen to be of a bright vermilion hue, and to be coated in places with recent lymph. On carefully drawing them out and examining them, four ulcers were found in the portion of the ileum close to the ileo cœcal valve, one of which had been perforated, thus leading to a fatal extravasation of the contents of the bowels. The largest ulcer was oval in shape, an inch in its long diameter, and was half covered by a slough, of which the other half had evidently been discharged. The others were circular, and of about the size of a sixpence; their margins were sharply defined, but not marked by vascularity All other portions of the inner surface of the bowels appeared to be healthy. The ovaries were large, congested, and covered with recent lymph. The kidneys weighed 9½ oz.,—the right 4¼ oz., and the left 5¼ oz. The capsule peeled off freely. Beyond being slightly paler than usual both organs appeared healthy, and a careful microscopic examination of recent and hardened sections failed to detect any evidence of disease. Other organs healthy.

CASE 8.—LONG-CONTINUED DROPSY, PROBABLY FROM CONGESTION. RECOVERY.

The following is a case of long-continued general dropsy, resulting apparently from congestion, of which the kidneys, in common with other organs, were the subjects, and which was relieved when this was removed:—Elizabeth Seaman, a teacher, aged 16, was admitted into the Royal Southern Hospital under my care on November 2, 1874. She had been dropsical for four months. Three years ago she began to suffer from nocturnal incontinence of urine, which came on, so far as she knew, without any cause. This continued till the commencement of the present illness, her health, but for the incontinence, having been previously good. So soon as the nightly flow of urine ceased, her legs began to swell. The swelling extended to the thighs, and for a month past to the abdomen, her breath the meanwhile becoming extremely short. When first seen, she was sitting up in the bed breathing very quickly (48 times in a minute). Her face was extremely puffed and cyanosed, the lips and lobules of the ears being of a deep blue colour, which contrasted strongly with the ashy pallor of the face; the pulse was 125, feeble, but regular. The feet, legs, and thighs were very much swollen; fluid to some amount was effused into the abdominal cavity, and there was considerable dulness at the bases of both sides of the chest, but more marked on the left. The appetite was poor, and there was occasional vomiting, but the bowels acted regularly. The tongue was but slightly coated. The urine that was first passed after her admission was acid, had a specific gravity of 1·022, deposited a copious precipitate of urates, and was highly albuminous. On examining the deposit microscopically, a number of small granular casts were discovered, in addition to the amorphous urates. A careful estimation of the urea by Liebig's method showed 28 grains of urea per 1000. The elimination of so large a relative quantity of urinary solids seemed inconsistent with the belief that the kidneys could be the subjects of serious organic disease. It seemed more probable that the scanty urine and dropsy resulted from the congestion which they shared with the general system, and that the best method of conducting the case to a safe issue would be to give a generally tonic treatment; while, at the same time, efforts were being directed to the local relief of the kidneys. To this end, 5 grains of the citrate of iron, 7½ minims of tincture of digitalis, with a few drops of spirit of chloroform were given three times a day. A light purely milk diet was ordered, and a powder of pig's pepsine (3 grains) and the ammonio-citrate of iron directed to be given with the food also three times daily. A sinapism was applied to the loins, and the hot-air bath directed to be used every night. This treatment was steadily persevered in for three weeks, the baths only being omitted so soon as all dropsy had disappeared. For the first few days but little, if any, effect was produced. On the night of the 10th only 5 oz. of urine were passed, its characters being nearly similar to those observed every day previously, viz., acid, specific gravity 1·025, very albuminous, and throwing down, when cold, an abundant deposit of urates. On the 11th, 17 oz. were passed during twenty-four hours. During the night of the 12th, only 6½ oz. were voided. She was very restless, suffering much from dyspnœa. Respirations, 40; pulse, 64; tongue much coated. On the 13th, she felt a little improved, having passed a better night, but the respirations were 48 in the minute, and only 6 oz. of urine had been voided during the twelve hours. Up to the present time but a very slight action of the skin had been induced by the hot-air bath. She was submitted to it for an hour during the evening of the 13th, with the effect of producing but the slightest perceptible moisture. During the 14th, about 20 oz. of urine were passed; and, as the bowels were not acting with sufficient freedom, half a drachm of compound jalap powder was administered. This was the only addition to the treatment previously mentioned. On the evening of the 14th she perspired freely for the first time in the bath. She was better next day, and still better on the 16th, during which the urine began to flow freely, 73 oz. being voided during the twenty-four hours. Pulse, 120; respirations, 44. On the 17th, 180 oz.; on the 18th, 129 oz.; and on the 21st, 150 oz. of urine were passed. The specific gravity on the 18th was 1·011, and there was no indication of albumen on the application of heat and nitric acid. The pulse was now 112—fuller than it had been; and the feet, which had previously continued cold, grew warm. All dropsy had now disappeared. On the 23rd the pulse was 92, and the quantity of urine fell to 66 oz. It was acid, had a specific gravity of 1·015, and contained no albumen. In fact, it presented all the characters of a normal urine. The quantity voided day by day ranged from 66 to 70 oz. This was rather more than should have been passed, and I should have preferred keeping the patient under treatment for two or three weeks more, substituting the more astringent salts of iron for the one employed, but as she had felt herself quite well for nearly a fortnight, and was extremely anxious to get home, I was obliged to dismiss her. The urine on her leaving the hospital was free from casts.

The valuable auxiliary which purgation may prove to the hot-air bath was shown here. Efforts had been made, unavailingly, day after day, to induce by its means alone a free action of the skin. A watery evacuation having been then obtained from the bowels, instead of the ordinary daily motion, the bath produced at once copious sweating, after which the urine was secreted in great abundance, and the patient speedily restored to health. Similarly I have found the action of a diuretic often promoted by the abstraction of a very small quantity of blood, even after the combination of purgatives had failed. Thus, in the case of a patient—a lady aged fifty-six—who was very dropsical, owing to the result of mitral incompetence, and on whom neither diuretics nor diaphoretics produced any effect, I simply took from two to three ounces of blood by leeches, and as the blood was flowing, gave the same diuretic as had been administered for many successive days without effect. It was then absorbed and immediately began to act. The urine was secreted copiously, and the dropsy in a few days entirely disappeared.

The preceding case has some alliance probably with those in which albuminuria is induced, as a result of the congestion following heart or lung disease, but differs from them in the very large proportion of albumen which the urine at first contained. Like them, it was characterised by the very scanty secretion of urine, rendered turbid by highly coloured urates. As in them, also, there were no uræmic symptoms, even when the amount secreted was very small indeed. It is unusual, however, even in very intense degrees of dropsy due to heart or lung disease alone, to find more than a small proportion of albumen in the urine. So generally is this the case that I always think it probable that independent organic disease of the kidney exists if, in pulmonary or cardiac affections attended with dropsy, the amount of albumen in the urine is considerable. On this point my observations perfectly agree with those of Bartels, who remarks that *" the quantity of albumen remains, as a rule, small, seldom reaching to two parts per thousand."† The sentence by the same author, which immediately precedes the one which I have quoted, however, contains a proposition that I cannot admit to be equally correct. It is that " directly

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* Ziemssen's *Cyc. of Pr. of Med.*, vol. xv., p. 206.

† It is but fair, however, to remark that this does not appear quite to coincide with the opinion of Dr. George Johnson, than whom no higher authority exists. In a communication to the *British Medical Journal* for May 25th, 1878, he says : "On the other hand we have the clinical fact that when, as a result of valvular disease of the heart, the return of venous blood from the kidney is impeded, the increased pressure on the malpighian capillaries is associated with a scanty secretion of highly concentrated urine, which, too, is often *copiously* albuminous." I give above merely the result of my own observation, which is, that the urine in heart disease is so seldom *copiously* albuminous that when I find it so I always suspect independent disease of the kidney, a suspicion which post-mortem examination has several times proved to be correct.

dropsy has begun one finds the urine also constantly albuminous." So far is this from being the case that, as I have again and again remarked, and pointed out to my clinical class as a matter for surprise, the greatest possible amount of general venous congestion may sometimes occur, accompanied by enormous anasarca, scanty urine, copious bronchial flow, &c., without there being the slightest reaction of albumen with heat and nitric acid, even up to the period of death, if the case should terminate fatally. I am willing to admit that in the majority of cases of cardiac dropsy there is albuminuria, but by no means in all. I will quote some cases at once in substantiation of my own statement, and in illustration of the kind of alteration in the urine which such affections produce.

CASE 9.—ACUTE DROPSY OF SECONDARY OR MECHANICAL ORIGIN.

Charles Simon, aged 36, a trombone player, was admitted under my care into the Albert Ward of the Royal Southern Hospital on December 10th, 1877. He stated that he was well and able to play his trombone as usual up to five weeks previous to his admission, when, without any cause, so far as he knew, he began to suffer from shortness of breath and dropsy. The feet, hands, and abdominal walls were greatly distended. The face also was swollen. The heart's action was feeble, rapid, and so irregular that the number of beats could not be determined. No bruit could be distinguished, but a distinct thrill was felt just below and outside the left nipple. It was impossible to localize the apex-beat. The hepatic dulness extended nearly as low as the umbilicus, the left lobe of the liver being enlarged as well as the right. There was distinct evidence of fluid in the peritoneal cavity. The urine passed during the first twelve hours of his residence in the hospital amounted to but six ounces, and had the following characters. It was turbid, of a brownish red colour, acid, specific gravity 1·029, and after standing for a time threw down a dense deposit of pink urates. Chlorides were abundant; sulphates present in apparently normal quantity; but there was *no albumen.* He was confined to bed, ordered one ounce of the French diuretic wine three times daily, and three grains of pepsina porci at breakfast, dinner and tea. The bowels were relieved by a mild aperient. Milk diet. On the following day he was substantially the same. The pulse was still so irregular and unequal that it could not be counted. The bowels had acted twice, and during the next eighteen hours succeeding the twelve above mentioned he passed 24 oz, of urine. I again carefully examined this and found no trace of albumen in it. During the 13th, the twenty-four hours' urine amounted to 59 oz. The next day it reached 132 oz., and on the 15th, 129 oz. Its specific gravity on this day was 1·013, and it was slightly alkaline, pale, and clear. The dropsy was rapidly disappearing; and as the stock of French diuretic wine had run out, I prescribed the following mixture in its stead; Potassæ acetatis, gr. 160; tinct. scillæ, m. 90; inf. digitalis, 4 oz.; water, 8 oz. Two tablespoonfuls three times a day. On the 16th 180 oz. of urine were passed; on the 17th 112 oz., the specific gravity of this latter being 1·013. After this the daily quantity rather rapidly fell to an amount less than normal. On the 20th there were only 27 oz., specific gravity 1·022, clear, acid, pale amber colour, chlorides abundant, sulphates present, no trace of albumen. He was up all day on the 19th, having been quite free from dropsy for a day or two previously. He left the hospital, feeling well, on the 27th, the pulse being then 50.

CASE 10.—DROPSY FOLLOWING MITRAL AND TRICUSPID INCOMPETENCE. PULSATING JUGULARS. ENLARGED LIVER AND SPLEEN. NO ALBUMEN IN URINE.

Agnes Bethel, a married woman, aged 30, was admitted under my care into the Victoria Ward of the Royal Southern Hospital on April 20th, 1877. The patient, who was a well-developed woman, dated her illness from the birth of her last child, eighteen months previously, since which time she had always felt more or less weak. She had never menstruated since. Twelve months before admission she was under treatment at the lying-in hospital for weakness. The present dropsy commenced two months ago by swelling of the feet. It then rapidly extended. She had been troubled with cough and expectoration during the past twelve months, and has occasionally spat a good deal of blood, the last time four and a half months ago.

On admission she was very dropsical. Feet, legs, thighs, and abdominal walls were extremely tense, and she complained of a great swelling at the lower part of her back. This was caused by œdema. The jugulars were powerfully pulsating. The cardiac sounds were so noisy, and so ran into each other, that it was difficult to analyse them at that time. It seemed certain, however, that the aortic valves were quite competent, as the second sound could be heard of normal character at the second left cartilage and in the neck. There was a powerful diffused wavy impulse in the neighbourhood of the left nipple, and the systolic murmur which was heard very distinctly all over the cardiac region, and was much prolonged, seemed to be decidedly louder immediately beneath the nipple than at the xiphoid cartilage. It was probable that there was both mitral and tricuspid regurgitation. The pulse was 88, feeble, and extremely irregular. The liver was much enlarged. Its lower edge, which was smooth and but slightly painful, could be felt nearly as low as the crest of the ilium, and passing thence transversely beneath the level of the umbilicus into the left hypochondrium, where it was somewhat difficult to distinguish its margin from that of the much enlarged spleen. The breath sounds were feeble, and bronchitic râles were heard in the left chest, otherwise the lungs were normal. A small quantity of urine passed during the evening of her admission, and before any medicine was given, was carefully examined and found to possess the following characters. Specific gravity, 1·022 ; acid, with a deep reddish-coloured deposit of urates when cold; chlorides, abundant; *no trace of albumen.* The urine was very scanty. During the succeeding twelve hours only 8 oz. were voided, with similar characters to the above.

The patient was placed in a warm bed, and on a moderately-restricted milk diet, and ordered a pill containing one grain each of squill, digitalis and pil. hydrargyri three times daily. The urine remained scanty on the 21st, the bowels, however, acting pretty freely. On the following day 64 oz. were voided. Specific gravity, 1·015 ; acid, with still a slight deposit of urates, but no albumen. On the 23rd the quantity rose to 84 oz., specific gravity, 1·012 ; 24th, 90 oz. ; and so on day after day, the œdema rapidly subsiding and the patient improving. The pulse became more regular in time and force, and all pulsation in the jugulars disappeared, though the liver continued large. On the 30th 104 oz. of urine were passed, and as the œdema had disappeared the pills were omitted, and twelve minim doses of tinct. ferri. perchloridi in an ounce of infusion of quassia given three times daily instead. The quantity of urine immediately fell, being only 62 oz. on May 1st, and 42 oz. on the 2nd. From 50 oz. to 60 oz. were passed every day for the next three weeks. After this, and up to the time of her dismissal on July 23rd, she took also ten minims of tincture of digitalis with the morning and evening dose. There was no other treatment, with the exception of an occasional belladonna plaster over the heart, which relieved superficial pain, of which she sometimes complained there. Ultimately she left the hospital entirely free from dropsy, and with her symptoms quieted down, but of course with such serious organic disease nothing beyond amelioration was possible.

If Bartels' statement would hold good any where surely it would have held good in this case. There were low arterial pressure, general venous congestion, a great amount of œdema, scanty urine loaded with urates, and yet I can most confidently affirm not a trace of albumen throughout the entire course of treatment. The effect of the combination of squill, digitalis and mercury, with complete rest in bed and warmth to the surface, in speedily reducing the dropsy and mitigating the symptoms, was very satisfactory.

The statement of Bartels, to which I have referred, is so positive, and so free from qualification of any kind, that I think it well to adduce yet further evidence in order to show that it is not correct. In the following case the mechanism of the dropsy was probably similar, *i.e.*, venous congestion, although brought about by a different process.

CASE 11.—CHRONIC BRONCHITIS AND EMPHYSEMA, ANASARCA, DEATH.

H. Peer, a clerk, aged 46, was admitted to hospital on February 7, 1877. He had been the subject of winter coughs for many years. He was a rather small man, with a thin face, but œdematous limbs. His cheeks and nose were red from coarse vascular injection. Tongue very wet. Dyspnœa was urgent, but the patient able to lie down in bed. Respiration 24. Expectoration muco-purulent. Percussion note clear generally. Moist râles everywhere over chest. Pulse 126, regular; right heart enlarged; venous pulsation in neck. Urine, acid. Specific gravity, 1·015, of a sherry colour; no deposit; no albumen; chlorides deficient. On the 19th there was a slight amount of blood in the expectoration. The amount of urine voided during twenty-four hours varied from 6 oz. to 16 oz., its specific gravity being often not higher than 1·010, yet there was never any trace of albumen. On April 2nd, bullæ, which had appeared on the legs, burst, and gave exit to a very copious serous discharge, owing to which the extremities assumed quite a wasted appearance. The urine for a time became more copious, 32 oz. in twenty-four hours. This formation of bullæ, discharge of serum, and subsidence of swelling occurred several times. Gradually the congestion became more intense. A sleepiness, from which it was very difficult to rouse him, came on; the nose and face generally assumed a purple hue; and he quietly died on the 17th. Yet, not many hours before death, when all the symptoms were most pronounced, a careful examination of the urine was made, and not a trace of albumen detected.

At the necropsy, twenty-nine hours after death, the kidneys were found congested, but otherwise healthy, their joint weight being 7 oz. Heart—weight, 11 oz.; right cavities enlarged; tricuspid orifice larger than normal. Lungs, voluminous, in parts very emphysematous; many of the bronchi thickened; much muco-pus in them.

And at the present moment there is in hospital a man named Edward Harding, who has been under my observation for nine or ten years, and who now, for the first time, is extensively dropsical, but in whose urine there is not the slightest trace of albumen. This man is the subject of chronic bronchitis, with emphysema; the right heart is enormously enlarged, and pulsates strongly below the xiphoid cartilage; the liver also is much enlarged; the external jugulars full and standing out like ropes; the face dusky and lips blue; the feet and legs very œdematous, and abundantly splotched over with purpuric dots and patches to the level of the knee, yet the urine is clear, and, as I before remarked, absolutely free from albumen.

What change takes place in the renal circulation thus to lead to dropsy, and in the majority of cases, albuminuria? And how are prognosis and treatment affected by the presence of albuminuria in the dropsy of heart and lung disease?

The causation of the albuminuria and dropsy is thus explained by Bartels: "The urine of these patients contains albumen directly the pulse of the wrist falls to its lowest ebb of weakness, and the stasis of the circulation in the veins advances to established cyanosis, and then, in consequence of the diminished arterial pressure, the quantity of urine excreted per diem falls to a minimum, and its specific gravity rises above normal, until at last hydræmia and dropsy ensue, on account of the diminished renal secretion and the retention of water in the system associated therewith. . . . Entirely agreed as al authors are in their description of this form of albuminuria, it still appears to me that here and there somewhat obscure ideas are entertained upon its immediate mechanical cause. Thus i is assumed that a congestion of the renal veins takes place and extends backwards through the capillaries to the vasa efferentia, reaching to and distending the malpighian tufts, that an increased pressure is thus produced within the coils of the glomeruli, until at last albumen becomes squeezed through the walls of the capillaries. Now a venous congestion, reaching up to the tufts themselves, as a consequence of disturbance of the circulation, such as we have here under discussion," *i.e.*, the congestion due to heart disease, &c., "would be rare and exceptional indeed, since 'the vasa efferentia,' as Senator rightly enough remarks, present a more favourable mechanism for obviating local and general stasis than we discover in any other capillary apparatus of the whole body, splitting up as they do, into a duplex capillarisation, two sets of networks really intervening between the artery and the vein. Any obstruction to the venous outflow will press first and hardest upon the interstitial capillary system, and thence be directed backwards in the direction of least resistance, upon the renal arteries. While, therefore, the interstitial capillaries, like those of the rest of the body, will experience the full impact of an augmented venous tension, the capillary coils inside the glomeruli themselves can have only a part of this additional burden to support." Now since the pathological conditions which bring about such a general stasis of blood in the venous system of the kidneys are necessarily accompanied by a diminution of arterial pressure, the vessels of the malpighian bodies, in which variations of arterial pressure are principally felt, must experience a less than normal strain. " For in them the diminution of arterial pressure is felt in its full entirety, the increased venous tension only in some degree" (Senator). And, a little further on: " I am altogether of the opinion entertained by Senator, that the relatively scanty albumen and blood which the urine contains in cases of heart disease with cyanosis finds its way into the secretion only after it has reached the renal tubules, and emanates from the capillary network surrounding these."*

If it were true that " directly dropsy has begun one finds the urine also constantly albuminous," then the explanation above given might have been considered correct; but as it is not true we must look further. To my mind that involvement in congestion of the capillaries within the glomeruli, which Senator and Hermann regard as almost a physiological impossibility, affords the most satisfactory explanation of the production of dropsy, and one which harmonises well both with clinical facts and with experiment. Those facts appear to me to teach us that albumen in the urine is always the result of abnormal lateral pressure on the walls of the malpighian capillaries. If this abnormal amount of pressure coincides with a *rapid* flow through the vessels, there is increased transudation of water as well as the presence of albumen—a condition of things constantly found in granular degeneration of the kidney, with accompanying cardiac hypertrophy. If, on the other hand, it coincides with *diminished* rapidity of flow, there is a lessened transudation of water; also, however, accompanied by albumen. The single cause which determines the presence of albumen in the cases where parenchymatous nephritis does not exist, is an abnormally high pressure. The only points in the renal vascular system on which that pressure can be so exercised as to be followed by a transudation of albumen, seem to me to be the capillaries within the glomeruli. The rapidity or slowness of flow which accompanies the pressure determines the amount of fluid transuded, but does not affect the albumen.

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* Ziemssen's *Cyclopædia,* vol. xv., p. 46, et seq.

No one imagines that the albumen which is found in small proportions in the urine of a patient suffering from contracted kidney is the result of a congestion in the capillaries surrounding the tubuli contorti. That is on all hands admitted to be a consequence of *direct* pressure on the walls of the capillaries of the tuft. But sometimes in the latter stages of this affection, the urine, from having been abundant, becomes scanty, the heart's action grows feeble, and dropsy makes its appearance, the albumen remaining as before. Is it evident that under these altered conditions the site of the albumen-transudation has been shifted from the capillaries of the tuft to those surrounding the tubuli contorti?

Again, if these latter vessels are the seat of the transudation in the passive hyperœmia of heart and lung disease, how does it happen that cases occur in which there is great general dropsy and no trace of albumen in the urine? I have shown that there are such cases, and I am persuaded, from my own examinations, that they occur not unfrequently. Yet there is no apparent reason why, in every such case, the capillary system surrounding these tubes should not participate in the general congestion, which has had for its result the production of a general dropsy. They are in direct continuity with the renal veins; just as the capillaries of the subcutaneous system are in direct continuity with *their* veins: yet, while through the walls of the latter an albuminous fluid is poured into the cellular tissue, there is oftentimes no albumen in the urine.

The reason for this seems to me to be, not that such capillaries are not equally congested with those of many other parts of the body, but that congestion of them alone is not sufficient to produce albuminuria, and that until this congestion makes itself felt in the glomeruli, that symptom will not be developed.

Experiments and clinical observation alike show that there are certain limits of blood-pressure in the larger arteries, outside of which, in either direction, albumen will appear in the urine. If the left ventricle becomes much hypertrophied, and the radial pulse indicates greatly increased tension, it appears ; and, on the other hand, if the ventricular contractions become very feeble, and tension in the radial artery be reduced much below the normal amount, it also appears. This latter result agrees exactly with that produced by Overbeck and other experimenters, who have found that compression of the renal arteries, and consequent lowering of pressure in their distal portions, is followed by the appearance of albumen in the urine.

The fact that it is impossible to inject the glomeruli through the veins has no bearing on the point, as there is no similarity between such an attempt and what is going on in low conditions of blood-pressure during life. In the one case it is an attempt to inject backwards, the only result of which probably is to fill the central vas efferens of each glomerulus, and by this very act to squeeze empty the capillaries that lie all around it tightly against the wall of the glomerulus, and thus shut them against the entry of the liquid. In the other it is an injection forwards against an obstruction which prevents the fluid passing freely *beyond* the glomeruli, and therefore tightly fills them. What seems to me to take place in the cases of heart disease attended by albuminuria is that, in the venous congestion affecting the kidney, in common with all other structures, the plexus on the convoluted tubes become loaded with blood ; but as long as the mean arterial pressure remains above a certain height the glomeruli are unaffected and the urine remains non-albuminous. When the pressure has fallen below this limit it makes itself felt in the glomeruli, swelling out the central venous portion (vas efferens), pressing the arterial (vas efferens), against the membranous wall, rendering more difficult the egress as well as the entrance of fresh blood, increasing the lateral pressure in the vessels of the tuft, causing a given volume of blood to remain for a longer time in the fine branching vessels, and lastly the appearance of albumen.

If this be so, and I cannot see how, on any other ground, the occasional occurrence of extensive general dropsy, without any albuminuria, can be accounted for, then it gives much greater importance to this sign than is often allowed to it, because the appearance of albumen becomes an indication of a more serious degree of congestion than the largest amount of general dropsy without it; and often it will justify the physician in giving a very gloomy prognosis. I myself have certainly seen several cases where, from it alone, I have felt called upon to warn the friends of the patients of very early death, and in each the event has justified the warning. The following is an illustrative example.

Case 12.

Mrs. M., a lady aged 60, residing some miles from Liverpool, had for five or six successive winters been under my care for recurring attacks of bronchitis. Slowly the right heart had become dilated, and irregularity and occasional intermission of pulse occurred during the attacks. A severe and prolonged attack was suffered during the spring of 1877. At the commencement of the succeeding winter cough again became troublesome, and the feet and legs began to swell, while the old irregularity and intermission appeared. The urine, however, was secreted in fair quantity, and, though examined on several occasions, was found to be free from albumen. I encouraged the patient to hope, therefore, that, by the maintenance of absolute rest, conjoined with the medicinal remedies employed, things would again right themselves, as indeed they did, and for a considerable time a fair measure of health was enjoyed. After having been up for some weeks, œdema, with its accompanying signs of cardiac weakness, reappeared. The urine was examined at the outset, and found to be free from albumen. Rest in bed, and renewed medicinal treatment, again overcame the symptoms, and the patient became at length so much improved in health that it was agreed that, though she was still to remain in bed, I should not visit her again for some days. When I did pay my next visit, I was surprised to find the feet and legs, which, when I had paid my last visit, were free from œdema, much swollen, although rest in bed had been strictly maintained. I learned, on inquiry, that the urine was very scanty, and on examining it, found for the first time that it contained albumen in addition to the usual deposit under such circumstances of urates.

The occurrence of this sign, together with the reappearance of dropsy, under circumstances the least calculated to induce them, deprived me of any hope of being again able to suggest means which should restore a balance so gravely disturbed. Although, therefore, the patient did not consider herself worse, except for the swelling, which, as it had come and gone on several previous occasions, she had not thought of sufficient importance to necessitate her hastening my visit, I informed her husband and daughter that she would not long survive. Day by day, in spite of all means employed, the amount of urine secreted became less and less, till on some occasions it only equalled an ounce and a half for the twenty-four hours; a condition of drowsiness supervened, and without any acute pain, and, as is usual, without any uræmic symptoms, unless the drowsiness be considered such, she quietly died ten days after my first recognition of albumen in the urine.

CHAPTER II.

ON THE TREATMENT OF ACUTE DROPSY.

IN addition to what appears in the history of the cases reported, I shall add a few words on treatment, and particularly on the influence of some articles of diet on the characters of the urine.

In the majority of those cases which result from primary kidney disease, there is doubtless either acute congestion or actual inflammation of that organ. The occurrence of blood in the urine; the diminution of the urinary secretion; some, though never any very great, elevation of the bodily temperature; a quickened pulse, and other signs of feverishness, would point to inflammation. The treatment should be directed to placing the inflamed or congested organ as much as possible at rest, and by that as well as other special means to relieving it of its abnormal amount of blood. In order to give the kidney rest, it is necessary to maintain complete repose of body; to administer a diet containing but a very moderate amount of nitrogen; to employ judicious counter-irritants; and to call into unusual activity other organs which are able to eliminate some of the products ordinarily eliminated by it.

In the treatment of albuminuria, as of many other abnormal conditions of the urine, as well as in the determination of the severity of a given case, the effect of diet, rest, and occupation must be carefully considered.

Thus the proportion of albumen in the night urine of a patient who is albuminuric is generally less than that of the day urine. This difference is very much more marked when the patient is up during the day than when he spends both day and night in bed. The greater the difference in the amount of albumen in the day and night urine of a patient who spends his days out of bed, the more hopeful is his case, because much of the albuminuria in such case depends on removable causes, and because the proportion of albumen in the night urine is the best index of the degree of organic change wrought by the disease uninfluenced by other conditions. Of the two chief causes of the larger elimination of albumen during the day, increased blood pressure, resulting from exercise, action of cold air on the face and surface of the body, &c., is more efficient than food. This can easily be proved by making an albuminuric patient pass one entire day in bed and another up, giving him similar food on both occasions.

CASE 13.

Thus J. B., a tall, large man, who had been some time previously admitted with dropsy from Morbus Brightii, drank on November 23rd, 1877, the day being spent out of bed, 60 oz. of fluid, and passed as urine 30 oz. Of this urine 16 oz. were voided during the day with the following characters:—Specific gravity, 1·032; acid, turbid from urates; urea, 2·875 per cent.; albumen occupying nearly $\frac{1}{4}$ of the portion of the test tube that contained urine; night urine, 14 oz.; specific gravity, 1·025; urea, ·15 per cent.; albumen not more than $\frac{1}{20}$ of space. Again on the 25th, fluid drunk, 70 oz.; quantity of urine for twenty-four hours, 49 oz. Day urine, 21 oz., not quite clear; specific gravity, 1·025; albumen, ⅕ of the space; night urine, 28 oz., quite clear; specific gravity, 1·019; albumen about 1/16 of the space. The whole of the 27th was spent in bed; 73 oz. of fluid were drunk. Total urine passed, 69 oz.: day's urine, 40 oz., clear; specific gravity, 1·019, scarcely a trace of albumen; night's, 29 oz.; specific gravity, 1·025; slightly turbid; ¼ of space albumen. Again in bed all day of December 4th; fluid drunk, 70 oz.; total urine, 64 oz. Day's, 31 oz.; specific gravity, 1·018; with only a slight diffused opalescence by heat and nitric acid; night's, 33 oz.; specific gravity, 1·023; albumen, ⅕ of the space. Here the relations of albumen to urine by day and night respectively were almost reversed by the patient lying in bed. The food was similar. The sudden fall in the proportion of albumen in the day's urine on each occasion seems only explicable on the belief that blood pressure was kept at its lowest when he lay perfectly still in bed.

If complete repose, coupled with the warmth to the surface which rest in bed ensures, is not followed by a diminution in the amount of albumen, the case must be regarded as less favourable than as though such diminution took place.

Diet again has a more marked effect on all urinary disorders than is, I think, often considered, and many common articles should be strictly forbidden in certain abnormal conditions. Thus, in irritable states of the bladder, as well as in those of the kidney, the urine being in the former case either neutral or slightly alkaline, or in chronic inflammation of the bladder or prostate, the kidney being presumably free from disease, the patient should not eat oatmeal, or any articles manufactured from it.

CASE 14.

Thus, in June, 1877, I was consulted by a medical friend, who, among other inconveniences, suffered from very frequent micturition. The urine was abundant, often as much as four pints in the twenty-four hours; and, though acid when passed, became speedily decomposed, depositing an abundant sediment of phosphates. Among other treatment I advised him to discontinue entirely the use of porridge, which he ate every morning for breakfast. The urine improving in character, he, after a time, went back to his porridge, with an immediate aggravation of symptoms.

I had so often been struck with the effects on the urine of a diet into which oatmeal largely entered in the cases of patients suffering from some urinary disorder, that I endeavoured to ascertain its effects on the urine of a healthy man.

CASE 15.

J. F., age 18, who had for some time been convalescent from acute rheumatism, was selected. He was a healthy-looking young man, rather below the middle height. On the full diet of the hospital he passed from 7 p.m., August 27th, 1876, to 7 p.m. on the following day, 36 oz. of urine; acid; specific gravity, 1·020, containing 1·85 per cent. of urea, and a total of 1·26 gramme of phosphoric acid. This urine retained its acidity for six days, gradually throwing down bundles of yellowish red crystals of uric acid, and in fewer numbers octahedra of oxalate of lime.

He then had nine ounces of oat-cake instead of an equal weight of bread, and nine ounces of oatmeal made into porridge, all the rest of his diet remaining unchanged. The urine for the next twenty-four hours measured 63 oz., quite acid, but with a sickly odour as of incipient decomposition; at the end of the twenty-four hours, opalescent; specific gravity, 1·020; urea, 1·275 per cent.; total phosphoric acid, 2·22 grammes. The reaction, as I have remarked, was still acid at the end of the twenty-four hours; but, when tested nineteen hours later, it was slightly alkaline, speedily became very offensive, abounded in bacteria, was covered with a greasy, iridescent film, and deposited a whitish sediment, in which were a few crystals of oxatate of lime, and many amorphous phosphates.

With an exactly similar diet for the next twenty-four hours. the following was the result. Total urine, 37 oz.; specific gravity, 1·010; neutral, pale, turbid, having an odour of decomposition. Urea, 75·75 per cent.; total phosphoric acid, 1·107 gramme. Fourteen hours after being passed the urine was very alkaline, and very offensive from decomposition.

On the following day, 30th-31st, with the exception of being a little heavier (specific gravity, 1·020), and the quantity being slightly less, only 32 oz., it was not substantially different.

The previous diet was then resumed. For the first day afterwards the urine much resembled that of the previous twenty-four hours. The next day (September 1st-2nd), however, it was very different. Total quantity, 42 oz.; acid; specific gravity, 1·018; urea, 1·8 per cent.; total phosphates, 1·75 gramme; dense deposit of pale urates. Twenty-one hours later the acidity was more marked, and crystals of uric acid had been abundantly deposited. It was still acid four days after having been passed. The examination was continued for several days longer, in the course of which the urine resumed exactly the character which it possessed before the oatmeal was commenced.

Another not uncommon article of diet, at least in the northern parts of England, are the scones, and the frequent use of these, as I have had abundant evidence, will produce very marked alteration in the urine, with a long trace of accompanying dyspeptic symptoms, that at once disappear on the obnoxious article being discontinued.

CASE 16.

Thus, to give an example, I was consulted in July, 1876, by a gentleman whose main complaint was excessive lassitude, which had lasted for many days, and which he could not shake off. Though not ill, he felt quite unfit for the performance of his ordinary duties, and inclined all day, he said, to lounge in an easy chair. He had no pain; heart and lungs were sound; stomach seemed normal; tongue was clean; bowels acting regularly. Urine passed in natural quantity, and not too frequently. I requested that it should be measured for twenty-four hours, and a portion sent to me for examination. The total quantity was 34 oz. On standing in the urine-glass it quickly became coated with a greasy film, and although slightly acid when I first obtained it, it became neutral in twelve hours, and soon after was alkaline and decomposing. Specific gravity, 1·029; urea, 1 per cent. A measured portion was evaporated to dryness, the residue weighed and incinerated, and the organic and inorganic solids then estimated. They amounted to 28·1 and 19·9 grammes respectively, or in the proportion of 1·41 to 1, instead of from 2 to 3:1, as in health. Microscopically, the white flour-like deposit which was thrown down was found to consist of amorphous matter and crystals, arranged in a stellate form, the whole dissolving in acetic acid. On finding that the patient had latterly taken to eat largely of scones, instead of ordinary bread, I recommended that he should entirely discontinue the use of these, and take no medicine until the effect of the change had been observed. I learnt that the symptoms entirely disappeared with the substitution of an ordinary bread for the alkaline bread which he had been using.

Articles that are so irritating under ordinary circumstances should obviously be avoided when acute inflammation of the kidney exists.

There can be but little doubt that the chief duty of the kidney is to get rid of effete nitrogen, which is discharged from it mainly in the form of urea, uric, and hippuric acids, and a few other less known chemical compounds. There is equally little doubt that the amount of nitrogen to be separated from the blood by the agency of the kidneys is greatly influenced by the character of the food, even if bodily exercise has a less effect than was once thought previously to the observations of Fick, Wisclicenus, and Parkes.*

In order, therefore, that there shall be as little work imposed on the organs as possible, it is better not to give in too large amounts the animal broths, such as beef tea, &c., which are so useful in inflammatory conditions of other organs, but to limit the patient to a milk or milk and farinaceous diet, with water as a drink. By this method the work to be done is minimized,

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* Though the conclusions of these gentlemen, as to the relation between such exercise and the elimination of urea, must be held to require great modification since the still more recent observations of Dr. Austin Flint on the urine of Mr. Weston, the American pedestrian, during his great walks—observations confirmed and extended by Dr. Pavy in this country.

Then as to the organs whose activity can in some degree compensate for the defective function of the kidneys, the first in the order of importance is the skin, and the second the bowels, including, of course, the liver. That the secretion of the skin should be the one most nearly resembling that of the kidney would seem probable from a mere consideration of the anatomical resemblance between the ultimate structure of the kidney and that of the sweat glands. But it is easy, as has been shown on p. 30, to prove that this is so.

The skin should therefore be excited to free action. This can generally be done by placing the patient in a warm situation, administering a diluted solution of the acetate of ammonia, each dose being immediately followed by a drink of hot milk and water, and by employing frequently the hot-air bath or hot bath.

Occasionally, the hot-air bath causes a feeling of faintness, and cannot therefore be employed. Under such circumstances other means must be relied on. Sometimes the action of the diaphoretics is much assisted by sponging the surface of the body with hot vinegar and water, when neither the hot-air, or vapour bath, nor the ordinary hot bath can be employed.

When other means of producing diaphoresis have failed, I have now and then employed jaborandi, but although it is followed by very copious sweating, its employment entails too much depression to allow of its being recommended.

Calabar bean will, however, sometimes produce a very free diaphoresis, especially when the pulse is one of somewhat high tension. An eighth of a grain of this extract I have known to cause this, when the hot-air bath could not be borne, and when other methods had quite failed to bring it about.

At the same time, as the bowels are generally confined, it is necessary to administer purgatives. Every now and then cases are met with, though not so frequently as in chronic dropsy from disease of the kidney, where diarrhœa exists without any medicine having been administered. In order to relieve the bowels, when constipation is present, the non-mercurial hydragogue cathartics are to be employed, and there is none which, on the whole, acts so satisfactorily as the compound jalap powder of the British Pharmacopœia, in doses of from 20 to 40 grains, according to circumstances. The action of the bowels can be kept up by the patient being allowed to drink a saturated solution of bitartrate of potash. If the compound jalap powder does not act sufficiently, elaterium, either alone, or as is much better, combined with other purgatives, and perhaps some aromatic, will do so. A combination of really great value is the one recommended by Dr. Graves in his "Clinical Lectures on the Practice of Medicine," edited by Neligan, vol. 2, p. 278. It consists of jalap, rhubarb and scammony, 5 grs. of each; elaterium, ½ gr.; bitartrate and sulphate of potash, of each ½ drachm, made into a bolus with syrup of ginger. The whole or half of this, according to circumstances, to be taken for a dose. The disadvantage of giving elaterium alone is that by the constant draining off of fluid the small intestine becomes quite emptied and contracted, while the colon and rectum are gradually packed with a solid or semi-solid residuum, which the patient cannot evacuate. By the combination given above, not only is the purgative action more certain, but this grave disadvantage is to a certain extent obviated.

If the congestion or inflammation is extreme and recent, wet cupping over the loins will assist in relieving it; and under all circumstances the frequent employment of the dry cups in the same region is likely to be attended with much benefit. Mustard plasters, followed by linseed-meal poultices to the loins, can be also usefully employed. Of course cantharides or turpentine must not be used as counter-irritants.

If uræmia, as manifested by persistent vomiting, eclampsia, the spasm of particular muscles, &c., is present, and there is nothing to contra-indicate its employment, venesection to 10 or 15 oz. will sometimes produce marked improvement. Examples of the advantages of this are given at p. 36.

After the more acute symptoms have been subdued, a prolonged employment of tonics is often advisable. The solution of dialysed iron, from not blackening or otherwise injuring the teeth (and not because it has been submitted to dialysis *), is very useful. Special care must be taken of the skin: flannel should be worn next to it for a long time, and the slightest risk of chill be avoided. Evening meetings in crowded rooms or churches should not be attended for the first winter after an attack of acute nephritis. The ordinary sitting-room should be large and warm, though not over-heated and its atmosphere vitiated by a great flare of gas. And it is better to have both bedroom and bed specially heated for the first winter after an attack, rather than run the risk of renewing it.

In the cases that are due to cardiac disease, digitalis in one form or another is always required. One of the best combinations is that of the vin diuretique of the Hôtel Dieu, or the

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* Probably some of the early popularity of this preparation arose from the belief, on the part of those who prescribed it, that it passed out with the diffusate, and consequently could, more readily than other preparations, traverse an organic membrane like that of the walls of the stomach, or the blood vessels; whereas, in reality, it remains in the dialyser.

compound pill mentioned on p. 65. The former in tablespoonful or two tablespoonful doses three times a day will often be followed by a largely-increased excretion of urine. But if it be desired to keep the stomach free from medicines, so as not to run the risk of interfering with its power of digestion of food, digitalis poultices may be applied to the loins, cloths dipped in a hot infusion applied to the surface of the body, or even the hypodermic injection of digitaline be employed. Both of the two former plans were employed at different times in case 12, p. 73. The poultice is made by macerating an ounce of the leaves in four of hot water, and mixing the whole together into a mass. With a view also of obtaining the absorption of the medicines which cannot be absorbed from the stomach owing to the distended state of the veins, diuretics may be inhaled in the condition of vapour, occasionally with useful results. Thus, two or three drachms of spirit of juniper may be placed on the sponge of one of Maw's inhalers, while boiling water is below it. Sometimes, however, this excites so much cough that it cannot be persevered with.

I should like also to bear my testimony here to the extreme value of ozonic ether, as a stimulant in the cyanotic condition of bronchitis. In one of the later attacks suffered by Mrs. M. (case 12, p. 73), when the lips and nails were very blue, the muco-purulent secretion abundant, the heart's action irregular, and death apparently imminent, improvement immediately commenced after the administration of that drug, and life was prolonged for nearly twelve months. Many other means had been previously employed, but without mitigating the severity of the symptoms, and things seemed to be well nigh at their worst, when without any other change of the conditions, except that of giving the ether in drachm doses five or six times daily, improvement began. I shall have occasion again to allude to the advantages of this drug in the treatment of uræmic asthma.

I always direct it to be kept in a tightly-stoppered or doubly-stoppered bottle, in a cool place, the dose to be poured out quickly into a sufficient quantity of water or milk, and the bottle to be kept inverted until the next dose is required.

Another remedy that will occasionally be found of very great efficacy as an auxiliary where the renal congestion is the result of cardiac disease, and particularly of mitral regurgitation, or this and tricuspid regurgitation together, is morphia, hypodermically injected in doses of $\frac{1}{8}$ to $\frac{1}{4}$ grain. I could relate many instances of very great relief afforded by the employment of this drug, after digitalis alone had failed under such circumstances, though I would on no account use it where the amount of albumen was considerable, or where there was other evidence of the kidneys being primarily diseased.

If the dropsy resists other courses, the introduction of a Southey's trocar, in the upper and outer part of one or both thighs, will often be followed by a great flow of pale albuminous fluid, and a subsequent increase in the quantity of urine. As will be seen later on, I had been in the habit of introducing small aspirating or other trocars previously to Dr. Southey's admirable instruments being made. Now I always employ them, and have on more than one occasion obtained over 140 oz. of fluid in twenty-four hours, with scarcely any inconvenience to the patient, by their means. Thus on April 24th, 1878, through a single tube there passed 115 oz. in twenty-four hours, in the case of Margaret Black (a woman under my care in hospital for this form of dropsy), besides much that flowed through a second tube on the opposite side, but which was not measured.

CHAPTER III.

CASES OF CHRONIC DISEASE OF THE KIDNEY (ORIGINALLY OF AN INFLAMMATORY CHARACTER) ACCOMPANIED BY DROPSY, BUT WITHOUT ANY MARKED DERANGEMENTS OF LIVER AND SPLEEN.

IN one marked character these affections, together with those that are associated with enlargements of liver and spleen (the lardaceous or albumenoid state), differ from cases of acute dropsy from kidney disease, on the one hand, and of chronic kidney disease with little or no dropsy (the cirrhosed kidney) on the other, viz., in the invariable presence of anæmia. If a person who is dropsical has a natural and healthy colour, or anything approaching to it, he certainly cannot be the subject either of chronic parenchymatous nephritis or the lardaceous degeneration. But, on the other hand, there is nothing inconsistent between the retention of such a colour and the existence of acute renal inflammation, of the renal congestion due to heart disease, or, lastly, of the most advanced condition of renal cirrhosis.

The usual symptoms, course, and termination of chronic kidney disease, associated with dropsy, will appear from the following cases, which I believe to be fairly representative :—

CASE 17.—CHRONIC KIDNEY DISEASE WITH DROPSY. GREAT RELIEF.

Ann Nolans, aged 30, married, was admitted April 21st, 1877, with the following history. She has had swelling of the feet at intervals for two years, but has only been generally dropsical for a fortnight. She thinks that her present illness was induced by cold. She is very anæmic and exceedingly dropsical, the face and limbs being greatly distended, and there being much effusion beneath the conjunctivæ. The abdomen is very full and tense, but the enlargement is almost wholly due to subcutaneous fluid. She suffers much from dyspnœa, and coughs and feels smothered whenever she attempts to lie down. Loud râles are audible all over the chest. Pulse 72, regular. No cardiac enlargement. Tongue clean. No vomiting, but a complaint of frequent shivering. The urine passed shortly after admission, before any food or medicine had been given, was acid, pale, slightly opalescent, specific gravity 1·011, contained 1·65 per cent. of urea, and was extremely albuminous (½). After separating the albumen the ratio of inorganic to organic constituents was found to be 1 : 3·4. A white flocculent deposit, small in amount, settled down, which microscopically was found to consist of plates and cells of pus, bladder epithelium, and some, but not many, large hyaline casts. No crystalline matter, no granular casts. Twenty-four hours later a little tenacious mucus appeared at the bottom of the glass containing the above urine, which was still *acid on the surface.* A little of the mucus brought up in a pipette was distinctly *alkaline*, and contained many crystals of triple phosphate. *The entire urine when shaken up gave an acid reaction.* Two days later the urine was alkaline throughout.

The first object here was to get rid of the dropsy. To this end the following treatment was prescribed. The patient to lie between blankets, a large mustard poultice, to be followed by hot linseed poultices, to be applied to the loins; one ounce of acetate of ammonia mixture every third hour, each dose to be followed by a hot drink; the hot-air bath to be used daily. The bowels being somewhat confined, 30 grains of compound jalap powder were given before the medicine was commenced. Milk diet. Water *ad libitum*. Perspiration was speedily induced and easily maintained; the urine began to be secreted in larger quantity, and the œdema rapidly to subside. On the 24th, 60 oz. of urine were voided, besides some passed at stool, the compound jalap powder, which had acted well previously, having been repeated. *This urine remained quite acid at* 10.30 *p.m. on the* 26*th*. After separation of the albumen, which was still as abundant as at first, the ratio between inorganic and organic constituents was found to be more nearly natural than before, viz., 1 : 1·9. Some of the first perspiration was collected, and was found to yield 1·125 per cent. of urea.

The treatment was continued till May 10th, when the dropsy having almost entirely disappeared, gallic acid was given, at first in 5-grain, and after three days in 10-grain doses, three times daily, an occasional aperient being administered.

On the 17th fish was allowed for dinner; on the 19th, potatoes; and on the 20th, by her urgent request, a little meat. Up to the 17th the milk diet had been persevered with.

On the 22nd slight œdema of right ankle appeared, after she had been up for two days. The leg was bandaged to the knee on the following day, and, in addition to the gallic acid, the following mixture was prescribed: Citrate of iron, gr. 5;

citric acid, gr. 5; solution of citrate of ammonia, 4 oz.; water to 8 oz. One ounce three times daily, an hour after meals.

She continued to improve, the urine being secreted in considerable amount—from 60 to 70 oz. daily—and the albumen being now reduced to ¼.

On June 5th, half-drachm doses of the tincture of the sesquichloride of iron, increased on the 8th to 2 scruples, were administered in an ounce of water sweetened with a drachm of glycerine, three times daily, instead of the previous mixture, and this was continued until her discharge, on the 17th of the same month, much improved in every respect, indeed *apparently* well, though still passing from 60 to 70 oz. daily of urine, containing a good deal of albumen, though much less than at first.

I met this patient in a street near the hospital ten months later. She continued well, having passed through the winter without any return of her illness.

The case was one of a mixed character. The history of recurring dropsy for two years pointed, in all probability, to a chronic parenchymatous nephritis, which had been rendered temporarily acute by some cause—the patient thought exposure to cold a fortnight previous to admission. The frequent shivering and constant appearance of pus in the urine showed that the pelvis of one or both kidneys had become involved in the inflammation.

The course of treatment is such as I think holds out the best prospect of amelioration, and, where the disease is not too far advanced, of cure, viz., the reduction of the dropsy by promoting the action of the skin and bowels; a carefully regulated diet; later on the citrate or one other of the non-astringent salts of iron, still given in a diaphoretic mixture;

and, lastly, the prolonged use of the perchloride of iron and gallic acid.

The compensatory action of the skin was proved by the large amount of urea in the first perspiration.

When, with the same general symptoms as were present in the last case, there are combined chronic diarrhœa, a dry skin, and a tendency, on the slightest provocation, to vomiting, the most that can be hoped for is alleviation. The kidney has generally become very large and fatty, and it has yet to be proved that the steps can be retraced by which it reached that condition from a healthy structure. Much, however, can be done to relieve, and if the patient's circumstances admit of his following out all the directions laid down for his guidance, there is no doubt that life can be greatly prolonged, and a considerable measure of comfort insured. The following is an illustrative case:—

Case 18.

James Connor, a porter, aged 34, was admitted under my care on April 30th, 1878. He was very anæmic and dropsical, the dropsical effusion affecting the subcutaneous cellular tissue universally, the subconjunctival tissue, the peritoneum, and presumably, from the diarrhœa and bronchial flux, the mucous and sub-mucous tissues also. He gave the following history. He had always had good health till ten or eleven months ago, when, after getting wet through three times in one week, he began to suffer from cough and spitting, and directly afterwards from vomiting. This latter symptom came on at first in the evening, from one to two hours after a meal. Shortly afterwards, however, it occurred in the morning also, and continued without intermission at these two periods of the day for some weeks. About three weeks after the first wetting he remarked that his legs had commenced to swell, and about the same time purging came on. He remarked that his urine was of a deep red colour at the time of the dropsy commencing, that it was diminished in quantity, but that he had to rise several times in the night to void it, which he was able to do without any difficulty. He had been for eight months under treatment at one of the general hospitals, where his symptoms had improved. The respirations were quickened, the lungs resonant but bronchitic, as shown by general wheezing and abundant frothy expectoration. There was no cardiac hypertrophy or derangement. The urine passed first after his admission was found to be neutral. Specific gravity, 1·021; so albuminous as to become solidified on boiling and adding nitric acid, and to be free from deposits. Fifteen ounces were passed in the first twenty hours, 68 oz. of fluid having been drunk during the same time, and there having been three actions of the bowels. The following treatment was ordered:—Absolute rest in bed. Milk diet. The hot-air bath, and the following mixtures: Ferri citratis, gr. 40; liq. ammoniæ citrat., 2 fluid oz.; acid. citrici, gr. 40; aquam ad., 8 fluid oz. Two tablespoonfuls every fourth hour.

The bath was continued for three-quarters of an hour, and produced moderate sweating. On the second night, however, the distress produced by it was considerable. As the temperature rose his breathing became hurried, and coughing was more than usually troublesome. Soon after the commencement of the bath he vomited, and this vomiting continued during the time of its employment and for some time afterwards. The slight deposit in the day's urine, when examined microscopically, was found to contain a small number of small hyaline casts, having a number of minute refracting dots over them, and a quantity of bladder epithelium, which was very fatty. There were no blood cells, The urine continued scanty, and the bowels to act from three to five times daily during the first three weeks. On the 22nd of May I had a small trocar passed into the abdominal cavity, through which 78 oz. of very pale albuminous fluid, having a specific gravity of 1·010, slowly flowed, This gave much relief, and was followed by an increased secretion of urine, and more marked diminution of the œdema, than had previously taken place. Thus, on the 25th, 44 oz, were voided; on the 30th, 51 oz.; on June 2nd, 57 oz.; the next day, 62 oz.; on the 11th, 71 oz., and so on. On the 5th it was noticed that the œdema had disappeared from the feet.

On the 13th, three grains of gallic were given three times daily in addition to his mixture, which was persevered with, No diminution in the quantity of urine followed the administration of the astringent, for both on the 14th and 15th 78 oz. were passed, and on the 16th 85 oz.; after which, as all dropsy had disappeared, and the skin began slightly to act, the weather being hot, there was a slight fall. The patient was up on June 20th, and has been walking about ever since. On the 2nd of July I commenced the hypodermic injection of two minims of the solution of dialysed iron, and the daily employment of hot baths, The patient has become strikingly improved in every respect and quite free from dropsy, though, with such advanced organic disease of the secreting structure of the kidneys, it is vain to hope for more than alleviation, The urine, which, when he was admitted, was semi-solid after being heated, allowing of the test-tube being inverted without loss, now contains about $\frac{2}{8}$ albumen.

From the marked improvement, however, there is no doubt that if the conditions under which he is now placed could be rendered permanent—the skin kept active, the diet nicely regulated, cold guarded against, and so on—the probability of his living for a long time would be very much greater than it can be under any other circumstances. As, however, perpetual hospital life is impossible, and as the means of the patient will not allow of his living an idle life, it is only too certain that renewed exposure to all the vicissitudes of temperature, which his kind of work renders inevitable, will bring back the symptoms with increased intensity, and materially shorten his days.

A complex morbid state of far more serious import is one in which, with a general similarity of symptoms and signs to those found in the preceding cases, the urine *continues* scanty, notwithstanding that by free purgation relief is afforded to the over-distended veins. In such cases vomiting frequently forms a prominent and painful symptom, and one, it need scarcely be said, of very bad omen, especially if it be persistent. That urea and other urinary products are sometimes eliminated by vomiting, I have no doubt, as on more than one occasion I have detected the first-named substance in considerable quantity by analysis of the vomited matters. The vomiting may, to a certain extent, therefore, be considered conservative; yet, as a symptom of the so-called uræmic state, it is very formidable, even if, as is not unfrequently the case where much dropsy is present, it stands alone, neither coma, convulsions, spasmodic dyspnœa, nor any other of the usual concomitants of the condition being associated with it. Indeed, I should almost venture to say, from cases which I have observed, that so long as vomiting continues frequent, the more terrible nervous manifestations of the uræmic condition usually remain in abeyance.

Patients frequently present themselves, with pale, œdematous skins; clear opaline sclerotics, with the conjunctivæ pushed forward from contact with them by effused sub-conjunctival serum; with dyspnœa, cough, and expectoration of bronchial mucus; with diarrhœa; and with scanty urine and persistent vomiting. Even under the most favourable circumstances, life, with such a combination of symptoms, will be short. Where the circumstances are from any cause unfavourable; where, for example, through poverty or otherwise, slight exposure to cold, or the taking of improper food, is unavoidable, it must of necessity be very short.

The following cases will illustrate this morbid state.

Case 19.

Thomas Evans, aged 36, a labourer, was admitted into the Royal Southern Hospital on May 10th, 1873. The patient, naturally large, was made to appear unusually so by extensive œdema. He had been the subject of a good deal of sickness during his life, having had, among other ailments, inflammation of the lungs in 1867. Since that period he had been in almost his usual health until nine months before admission, when he was suddenly seized with diarrhœa, which lasted for six months, and as soon as it was stopped, was followed by swelling in the abdomen, and subsequently by swelling of the legs and feet, which had continued ever since. When admitted he was found to have a very clear pale complexion, pearly white sclerotics, much effusion beneath the conjunctivæ (the typical Bright's eye), and universal anasarca. His breath was distressingly short, necessitating his being propped upright in the bed. The breath sounds were feeble, but otherwise normal anteriorly. His breathless state and distress on being moved did not admit of any examination posteriorly then. The heart's impulse was powerful, and its area of dulness much increased, the sounds being normal. He was passing very little water, and what little he did pass was loaded with albumen, acid, and had a specific gravity of 1·019. He complained of suffering much from vomiting, and from pain in the abdomen soon after taking food. His sleep was broken, the fitful dozes which he obtained being disturbed by tumultuous dreams. The abdominal cavity contained a good deal of fluid. The bowels had been regular for the past three months. He stated that his habits had been temperate, but that he had been very much exposed to cold and wet in his work as a tunneller. The man was evidently in the last stage of disease, and in danger of speedy death. He was ordered to be placed in the most sheltered part of a small ward; to have an exclusively milk diet, which was to be given to him in small and frequently repeated quantities; to have a mixture of liquor ammoniæ acetatis, with seven drops of tinct. digitalis, four times daily; each dose to be followed by a warm drink, and to have the hot-air bath every night, unless it caused much distress. This treatment was followed by some amelioration. There was a slight increase in the quantity of urine, 23 oz. of which were passed on the 11th, 22 oz. on the 12th, and 25 oz. on the 13th, respectively. On the 14th spontaneous diarrhœa occurred; and on the day following the quantity of urine voided reached 38 oz., and on the 18th 40 oz. The amount of albumen continued unchanged, and there was not much alteration in his condition, which, though somewhat relieved, still continued very precarious. On the 18th, 15 minims of tinct. ferri perchloridi were added to each dose of his mixture. The next day but one the quantity of urine voided during the twenty-four hours fell to 16 oz., and the bowels becoming a the same time slightly confined, half a drachm of the compound jalap powder was administered. This acted somewhat freely, and the action was maintained by a solution of bitartrate of potash, of which he was allowed to drink. The quantity of urine still continuing scanty, the iron mixture was omitted, a mild diuretic administered, and dry cupping applied to the loins. The diuretic consisted of small doses of the bicarbonate and nitrate of potash, freely diluted; while this was being taken, the loins were dry-cupped, and cloths, soaked in a warm infusion of digitalis, were wrapped round the abdomen. This treatment was followed by an increase in the quantity of urine from 16 oz. on the 28th to 20 oz. on the 29th, and 30 oz. on the 30th. On the 31st it again fell to 20 oz. On June 2nd it was 24 oz., but on the 10th it fell to 10 oz. The dry-cupping was again and again employed, and on the 3rd a solution of citrate of ammonia, with 5 grs. of ammonio-citrate of iron, and $\frac{1}{30}$ gr. of antim. tart. in each dose, was given instead of his former mixture. No action of the skin being induced, the hot-air bath was prescribed; but, on the attempt being made to give this, so much distress was occasioned to the breathing, with so great a feeling of faintness, that its use had to be discontinued. Severe headache was added to his distress on the 5th, and the diarrhœa recurred very severely on the 9th, during the whole of which and the following days he became weaker and weaker, and died on the morning of the 11th.

At the post-mortem examination much serous fluid was found in the cavities of the peritoneum and pericardium. The lungs were œdematous but otherwise healthy. The kidneys were large, pale, and fatty, and weighed each 7 oz. The heart was large; weight, 28 oz. Liver pale, $68\frac{1}{2}$ oz.

Throughout the whole of the case there were nausea and occasional vomiting, and a very scanty secretion of urine. I think this case shows that much more discrimination than is generally exercised is required in the administration of the astringent salts of iron. Theoretically, nothing is perhaps so strongly indicated in many cases as these salts. As has been well observed by Sir R. Christison, no disease seems so destructive to the red corpuscles of the blood as this. The cruorin appears to be incapable of complete regeneration in a blood so altered in constitution as that which exists in this form of chronic kidney disease; or if this complex organic substance does exist in normal quantity, its composition appears to be so modified as to render it far less capable than it is in health of ministering as an oxygen-carrier to the chemical changes in the tissues necessary for their due nutrition. But even if, in all cases, theory pointed to the advisability of administering the astringent salts of iron, practice as certainly proves that they are occasionally injurious. I have no doubt that their administration in the above case was followed by an increase in the intensity of the symptoms. I was so struck with this as to be led carefully to observe their effect in a number of cases, the results of which observations I embodied in a paper, communicated early in 1875, to the Northern Medical Society of this town, entitled "The Necessity for Caution in the Administration of the Astringent Salts of Iron in some Forms of Chronic Kidney Disease." Since that time I have observed with much satisfaction a similar caution urged by Dr. Howship Dickinson.

Another case somewhat resembling that of Evans, but where great temporary relief was obtained, was that of George Shone, a labourer, aged 41, who was admitted into the old Southern Hospital on December 8th, 1870, Case 19. He stated that his illness had commenced six months previously by swelling of the feet and ankles, and occasional shortness of breath. The swelling was at first slight, but had subsequently increased greatly till at length he was quite unable to work. He had been obliged for a long time to pass water several times during the night. His habits had not been very temperate. On admission his skin was very œdematous, the lower extremities being enormously swollen. His face was pale and puffed, and he had "Bright's eye." There was no urgent dyspnœa, and but for the dropsy he thought he would be able to work. The bowels were confined. Half a drachm of compound jalap powder was given to him, and ordered to be repeated daily, or every second day, according to the extent of its action, and, as well, a mixture containing small doses of the bitartrate of potash. Tolerably free purgation was induced, and following this, the urine began to flow more copiously than it had done, the dropsy rapidly disappearing. On the 16th it was almost entirely gone. An eighth of a grain of powdered elaterium was added to his powder, as the bowels were not acting with sufficient freedom, and he was ordered to commence the use of the tinct. ferri sesquichloridi, but still to remain in bed. On the following day, contrary to direction, he got up and remained up for some time, feeling tired, as he said, of being in bed, when, as he thought, he was pretty well. The weather was intensely cold, and he became chilled. When I saw him the next day there was a very marked change for the worse. Up to the 17th the urine had not much changed in character. It was pale, had a specific gravity of 1·010, was slightly acid, and contained a good deal of albumen. The deposited albumen, when his urine was first examined after admission, occupied a quarter of the volume of the urine in the test tube, but was gradually diminishing. On the 18th it became scanty, was very bloody, but the specific gravity rose to 1·017, and the deposit, when examined microscopically, was found to contain many blood and granular casts. His breath became short, respirations 30 in the minute, and accompanied by bronchitic râles. The pulse was 108. Means were undertaken in hope of subduing the bronchitis and of restoring the urine to its previous state, but unsuccessfully, and his one act of imprudence cost him his life. The bronchitis became more intense, and he died on the 26th, remaining quite sensible all through. On examination after death, the kidneys were found to be large, white, and fatty, the two together weighing 19 oz. The surfaces were smooth, and the capsule came readily off.

CASE 20.—ANASARCA OF FIVE MONTHS' DURATION. HYDROTHORAX. SCANTY SECRETION OF HIGHLY ALBUMINOUS URINE.

This case presented several points of much interest, and illustrates forcibly the advantages derivable from treatment, even under very unpromising circumstances. The subject of it was a charwoman named Quinn, aged 35, who five months before admission had begun to suffer from swelling of the feet. For a few days previously to the commencement of the œdema the urine had been scanty. The rapid extension of the swelling soon entirely unfitted her for work. On admission, on Feb. 21st, 1876, she was enormously distended, the abdomen at first sight looking as though filled with ascitic fluid. On examination, however, it was found that the appearance was entirely due to very great œdema of the cellular tissue. The umbilicus was represented by a narrow cleft extending deeply below the surface. The surface of the abdomen was covered with spots of lepra, some recent, others fading, of various sizes. The face was pale and puffed, and the right chest dull from apex to base anteriorly. Posteriorly the dulness did not extend higher than the spine of the scapula, at which point there was a very distinct ægophony. The left chest was normal. The heart's sounds were regular, but the first was distinctly prolonged, though not reduplicated, and the second was markedly accentuated. The impulse was strong and the organ enlarged, the apex beat being, as near as could be determined then, below and immediately within the nipple line, in the sixth interspace, or opposite the sixth rib. The tongue was clean and the bowels regular, inclining, however, a little to constipation. She at no time had had pains in the loins, but had chiefly complained of the breath having grown distressingly short. She says that she still passes but little urine, but that she has to rise two or three times in the night to micturate, and that she had to do this for some time before the commencement of her present illness, which she attributes to exposure to wet and cold, from scrubbing wet floors. Menses suppressed for six months.

A hot-air bath was directed to be used every night; and every fourth hour she was to take an eighth part of the following mixture, each dose to be followed by a drink of hot milk and water:—Vin. ant. tart., one drachm; liq. ammoniæ acetatis et aquæ, of each four ounces. Mix. The bowels not acting freely, 30 grs. of compound jalap powder were ordered. Milk diet. Patient to lie between blankets. The first bath caused but little sweating. The bowels acted four times loosely; and during the succeeding twenty-four hours she passed 40 oz. of urine, having the following characters:—Pale, alkaline, with a considerable deposit of triple phosphate, and numerous microscopic casts, hyaline in character, some of which were apparently sprinkled with minute oil-drops and others studded with free nuclei. There was also an immense number of oil-drops of a varying size scattered over the field; some so-called compound granule cells of a yellowish colour; and very much granular débris. The specific gravity was 1·011; urea only ·5 per cent. The albumen was very abundant, filling half the test-tube occupied by urine. Fifty c.c. were acidified with a few drops of acetic acid and boiled, the albumen separated by filtration through a small weighed filter, washed carefully with distilled water, dried and weighed. In the 40 oz. of urine there were about three drachms and six grains of albumen (12·015 grammes). After the albumen was separated the filtrate was evaporated carefully to dryness and maintained at a temperature of 200° F., till it ceased to lose weight. Probably through a slight charring which took place at first, owing to an incidental rise in the temperature, there was slight loss in the remaining organic solids, as, for the whole of the urine, they did not amount to more than a little over 60 grains (4 grammes). The total salts weighed 108 grains. The ordinary ratio of organic to inorganic constituents was completely reversed. In most healthy urines this ratio, which is fairly constant (as was first pointed out, as far as I know, by Mr. Wanklyn in his excellent little book on "Water Analysis"), is 2 of organic to 1 of inorganic, whereas here it was nearly 1 of organic to 2 of inorganic (or probably 1·5 to 2, owing to the loss mentioned above).

23rd. Urine, 20 oz. in twenty-four hours. Bowels opened four times, loosely. Copious perspiration in the bath, which could only be continued for twenty-five minutes in consequence of a feeling of faintness. I have no record of the amount of urea in the perspiration. The legs were not quite so tightly distended. Physical signs of chest as before.

26th. Much headache. Great pain in lower part of left chest. Vomited in the morning. The distension of the subcutaneous cellular tissue continuing very great, I introduced a medium-sized aspirator tube into the thigh, to see if, by exhaustion, I could draw off some of the fluid from the cellular tissue; and if this could not be done, to leave the tube in. No fluid flowed into the exhausted bottle, so the tube, which had been passed in obliquely beneath the skin so as to allow of its being strapped down by a piece of plaister, was retained.* The next day there was a very free discharge, which soaked into and completely saturated the blanket. The trocar was kept in till the 2nd of March, when, as it began to cause irritation, it was removed and re-introduced into the cellular tissue on the right side of the abdomen, the sensibility of the part punctured being deadened by the local application of ether as a spray. I caught the first fluid that flowed in a clean test-tube. It was perfectly pellucid and unstained by the least drop of blood. I was much surprised, however, to find that in a short time it had set into a clear coagulum, which occupied at least four-fifths of the tube, with a little serous fluid on the top. This spontaneous coagulation of anasarcous fluids may be much commoner than I imagined. It is not often, I suppose, that the liquid is collected so as to admit of its being examined. If it were so, instead of being merely allowed to drain away, it would perhaps turn out to be less a matter of surprise than I thought it. I had not previously observed it, however, although I had collected similar fluids in order to test them for urea, which was the chief purpose for which I collected this. Fine opalescent films passed across the coagulum in various directions, and seemed to tether it to the sides of the tube. Indeed, it was in trying to bring one of these up in the pipette, in order to examine it microscopically, that I first became aware of coagulation having taken place; for I found that the pipette was resisted and that nothing flowed into it. In the course of twenty-four hours the coagulum had become for the most part liquefied again, when I examined it for urea, but found that it did not contain more than ·05 per cent. of that substance. This exactly agrees with the examinations made before and since. Thus, in a case which I saw with Dr. D. Hendry, of very extensive and chronic anasarca, caused by prolonged exposure, I found only ·07 per cent. of urea in some of the fluid collected from punctures in the legs.

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* This was before Dr. Southey's excellent trocars were introduced, or at least before I was acquainted with them. I now always employ them.

While speaking of the fibrinous character of the dropsical effusion in the present case, I may refer to the opinion of Rayer, that a distinctive mark by which such effusions, when due to renal disease, can be distinguished from those which have a cardiac origin, is, that in those of the former character discharge does not, while in those of the latter it does, take place readily through punctures made with a needle. Now, although this statement, if made without qualification, is certainly incorrect—as I myself have sometimes obtained a good discharge from punctures made in renal disease, and once, at least, failed to obtain more than the slightest and most inefficient amount when the affection was undoubtedly cardiac—yet it may be that sometimes the fibrinous character of the effusion may be such as to prevent a free discharge through needle punctures.

Again, the circumstance that the effusion into the cellular tissue was in this case distinctly fibrinous and capable of spontaneous coagulation, must be considered side by side with the fact that hyaline casts were being voided in the urine. Here was a passage of blood-plasma from the capillaries of the system generally into the cellular tissue, without any apparent disease of those capillaries or of that tissue. Must we not expect that the conditions which would lead to it would lead to a similar discharge through the renal capillaries? This hints at the possibility of urinary casts being formed, under some circumstances, as the result of mere variation in the intensity of blood-pressure, and without any organic change in the kidneys themselves. For we cannot suppose that any other cause was in operation, so far as the cellular tissue was concerned. I am assuming that the coagulation, which only took place after the fluid from the cellular tissue had been some time in the test-tube, could occur within the tubuli uriniferi. But this assumption must be allowed to be a fair one, or it would be difficult otherwise to account for the formation of *any* hyaline casts whatever. It is not supposed that they pass as solid bodies, ready formed, into the tubuli, but as a fluid from the capillaries, or the urinary secreting cells, which subsequently solidifies. If it can be proved that urinary casts can probably be formed as the result of mere increase of blood-pressure, it may perhaps lead to a modification of our judgment as to their clinical importance in some cases: but that casts may occur quite independently of organic disease of the kidney is quite certain. The highly interesting case of Weston, the American pedestrian, reported by Dr. Pavey in the *Lancet* for February 26th, 1876, is alone sufficient to establish this. As the effect, probably, of a mere temporary congestion, which coincided with a passing feeling of indisposition during the performance of one of his extraordinary walks, the urine of Mr. Weston was charged with a number of large granular casts. I may allude also to the observations of Dr. Finlayson, published in the *Glasgow Medical Journal* for January, 1874, and the *British and Foreign Medico-Chirurgical Review* for 1876, that tube casts occur in the urines of patients suffering from jaundice without any albumen being present. In fairness, I ought to say that since reading Dr. Finlayson's papers, I have carefully examined such urines for casts again and again, taking every precaution against introducing them by means of pipette or otherwise, but have not felt certain that the elongated cast-like bodies which I have certainly seen more than once, though on the whole but very seldom, were really urinary casts.

Careful pulse-tracings were taken from the radial artery, and subsequently photographed, Mahomed's sphygmograph being used, and a pressure of 4 oz. placed on the spring. The conversion of what, in health, is the apex of an acute angle into a horizontal line of appreciable length—or, as it is sometimes called, the square-headedness of the tracing—pointed plainly enough to the heightened pressure in the radial artery, and implied a considerable obstruction in the arterioles, at the distal extremity of the blood-vascular system, an obstruction which kept the larger vessels full while the frame was travelling along an appreciable space. In strict agreement with this heightened blood-pressure were other physical signs. Thus, the apex beat was carried downwards and outwards, and the impulse was stronger and more heaving than in health. The point of maximum intensity of the beat against the chest-wall was considerably below the nipple, and only just within its vertical line. The first sound, though not actually reduplicated, was prolonged, and there was a decided accentuation of the second sound, proving that the act of ventricular contraction was prolonged, and the elastic recoil of the aorta increased, above the natural limits. Here, then, were all the indications of obstruction in the minuter vessels ; rise of blood-pressure in the arteries nearer to the heart, in consequence of this obstruction ; and hypertrophy of the left ventricle, induced by the increased efforts of its muscular tissue to overcome that obstruction, and serving, by the greater injecting force thus acquired, to increase the distension of the intermediate vessels so long as the obstruction should last. As an almost inevitable result of this condition of high tension was an abundant secretion of bronchial mucus and consequent cough ; and possibly, partly from the same cause, and partly from diminished elimination of urinary products through the kidneys, and secondary irritation of the stomach, increased gastric secretion and vomiting.

Two views could be entertained of this case. The constantly high arterial tension might imply the passage of the kidney from the large white to the contracted condition, or what would be Dr. Grainger Stewart's third stage of parenchymatous nephritis ; or it might imply, what I think is much more probable, that cirrhosis had to some extent advanced, the patient, however, considering herself in health, when, owing to exposure to wet and cold, there was superinduced upon this condition an inflammation of the epithelial elements—a true parenchymatous nephritis (as the technology of the day goes).

The second view certainly seemed to me the more probable one, although the evidence in favour of it was not so clear as it sometimes is. The patient herself, however, volunteered the statement that she had been obliged to rise several times in the night to micturate for a considerable period before the onset of her illness. This was a very important fact, and one which, when considered in relation with the cardiac hypertrophy, the increased arterial tension, and the comparatively short time that the dropsical symptoms had lasted, leaves very little doubt on my own mind that the view which I took was the correct one. This case might, therefore, as appropriately have been placed among others of this mixed kind which I shall have to relate. As I remark elsewhere, to my mind the evidence for the existence of such a third stage of parenchymatous nephritis as Dr. G. Stewart and other writers following him describe, is not sufficiently conclusive.

On the night of the first introduction of the trocar she seemed very ill. The dyspnœa was so urgent that the house-surgeon was called up at 2 a.m. He found her restless, and, on examining the chest, heard loud snoring rhonchi with expiration over the right side, while the left side seemed less dull. Fluid was flowing freely through the tube, the presence of which, probably, had excited her. After a short time the dyspnœa greatly subsided, without anything being done beyond quieting her fears that she was very near death.

On the 29th she felt much better. Urine, 20 oz.; specific gravity, 1·025.

March 1st, Continues to improve. Slept nearly all night. Bowels opened twice. The discharge through the trocar still continues. P. 98. Chest sounds as before. The dyspepsia continuing, three grains of pepsina porci were given three times a day with her food. It was remarked that the flow through the trocar was always greatly increased during the time of administering the hot-air bath.

After the above date all the symptoms and signs began to improve. The chest became gradually less and less dull; the sputum diminished; the urine contained less albumen; the quantity of urine increased; the bowels became less irritable; and the skin became moist.

By the 15th the right leg was all but free from œdema. Left one still œdematous, though much less so than it was. As the action of the bowels became less frequent, more urine was passed. Thus, on the 14th, 15th, and 16th, the amount reached, respectively, 58, 76, and 62 oz. On the 16th it was necessary to give 30 grs. of pulv. jalapæ co. This produced six motions, which, however, were not loose. On the 18th she could lie down for the first time. She was unable to lie on the left side for more than a few minutes, but could rest when lying on the right side without inconvenience. On this day, 4 minims of nitrite of amyl were inhaled, and a pulse-tracing taken immediately before and immediately afterwards, under the same pressure as had been employed previously. The characters of the tracings were practically similar, the tension being but slightly diminished by the nitrite, which caused but a faint momentary blush and a transient feeling of "lightness in the head." The heart's action was immediately quickened in the proportion of 25 to 20.

On the 20th, 112 oz. of urine were passed. All œdema had disappeared, though she had been up since the 18th. She was also entirely free from cough and expectoration, and felt well and desirous of going out. I urged her to remain in longer, but she begged to be discharged on the 22nd, feeling, as she thought, fit for work.

On the 21st, 74 oz. of urine were passed; specific gravity, 1·016; containing still a considerable proportion of albumen.

My reasons for considering this case one of cirrhosis, followed by parenchymatous nephritis, have been given above. An additional reason was the very slight and transient effect produced on arterial tension by the inhalation of the nitrite of amyl. Several detailed examinations of the urine were made at different times, similar to the one made shortly after her admission. They showed a gradual improvement, especially in the approximation to a ratio more nearly normal between the organic and inorganic constituents. The progress and termination of the case, so far as they went, were very satisfactory.

The kind of treatment most calculated, in my opinion, to benefit disease of this kind, has been set forth in detailing the individual cases.

CHAPTER IV.

CASES OF KIDNEY DISEASE, WITH ALBUMINURIA, AND USUALLY WITH MARKED ENLARGEMENT OF LIVER AND SPLEEN. (WAXY, LARDACEOUS, OR ALBUMENOID DISEASE.)

THE following cases are examples of this form of disease. They fairly represent its symptoms and course, and indicate, as well, the conditions which are thought most commonly to lead up to it.

Hugh Carroll, a labourer, aged 24, was admitted into the Southern Hospital, under my care, on the 9th of May, 1872. He said that he had always enjoyed good health up to eight years ago, when he sustained a fracture of several ribs, for which he was treated in the Liverpool Royal Infirmary for seven weeks. During this time a large abscess is said to have formed in the abdominal wall, from which a great quantity of pus was discharged. He subsequently had inflammation of the lung, but recovered sufficiently to be able to resume his work. Since Christmas, however, he has felt continually unwell and too weak to perform his ordinary duties. His mother is alive and well, aged 63. His father died two years ago of consumption. One brother and one sister are alive and well; eight other children died in infancy or when quite young. He himself looks stoutish, but is pallid, pasty, and very short-winded. On examination, the liver is found to be considerably enlarged, its vertical measurement in the right nipple line being 5¾ inches. Its lower edge is smooth, hard, rounded, and inelastic, and rises and falls freely with respiration, showing that there has been no perihepatitis to bring about an adhesion of the liver to the abdominal wall. The portion of the anterior surface that is below the ribs feels quite smooth, presenting no nodulation or projection anywhere. The spleen is large and tender. To the right of the enlarged spleen, and separated from its sharp anterior edge by a distinct groove, is a tumour, apparently about as large as a turkey's egg, clearly perceptible to eye and touch, flattish, with its long diameter pointing right and left, and its lower edge only just below the umbilicus, rising and falling freely with respiration, and distinctly tender when manipulated. This appeared to be attached to the left lobe of the liver. Its movements with respiration excluded the idea of its being either mesenteric, enteric, or stomachal, and its rounded edge, with the occurrence of a distinct though slight groove between it and the anterior margin of the spleen, shut it out from being splenic; although, like the spleen, and unlike the right lobe of the liver, it was tender when touched. His girth round the waist, at the lower margin of the ribs, was 34 inches, yet there was no ascites. The breath sounds were feeble but otherwise healthy; but there was a distinct soft blowing sound heard at the apex of the heart at the period of systole. Pulse, 104. The urine was abundant, pale, specific gravity, 1·007, acid, and very albuminous. Regularly every day he passed from three and a half to four pints of urine, presenting the above characters. There was, therefore, little or no œdema.

He was ordered to take 15 grs. of chloride of ammonium in an ounce of infusion of gentian three times daily; to have a drink containing ʒij of diluted phosphoric acid to a quart of water; and to have the following liniment rubbed over the abdomen morning and night: Tinct. iodi, ʒiij; glycerini, ℥j; aq. ad. ℥viij. On the 22nd, 5 grs. of citrate of iron and quinine were given to him three times daily in infusion of calumba, instead of his previous mixture; the other treatment being continued. On the 28th a number of purpuric spots appeared on his legs. He had had similar spots in the same part about three months previously, he said. This purpuric eruption, which became pale every evening, and appeared again the first thing on the following morning, continued for many weeks. On the 7th of June he was suffering from coryza, in consequence of which the iodine liniment was omitted. On the 11th he had smart bleeding from the nose for ten minutes; and on the 19th the epistaxis recurred, the bleeding this time being very profuse. On the 22nd of June an alkaline mixture, containing 20 minims of liquor potassæ in an ounce of water, was given to him three times daily instead of his iron mixture, and was continued until his discharge on the 27th of July. The unguentum potassii iodidi was also now rubbed over the surface of the abdomen night and morning. On the 30th there was again a profuse bleeding from the nose. On the 6th of July slight œdema of the ankles appeared, and ten days later copious purging, which lasted for three days. The patient was discharged on the 27th July, after nearly three months' residence in hospital, without any material alteration in his condition.

Epistaxis is of very frequent occurrence in this as in most other affections in which the spleen is originally diseased. I have never, except in one case, seen any decided benefit from treatment in advanced lardaceous disease, and that was a case where the lardaceous change had had a cirrhotic condition superadded to it, with consequent ascites. That the patients can be guarded against intercurrent disorders to which their condition would make them easily succumb, such, for example, as bronchitis and other effects of cold, and that the rapidity with which the morbid change had been progressing can be lessened by careful hygienic, dietetic, and medicinal treatment, is tolerably certain, but as yet we want evidence that the cells and vessels which have become thickened, transparent, and inelastic, can ever be made to retrace the steps by which this alteration in structure has been effected, and so to regain their original constitution.

The following is another typical case of this affection. Henry Wensley, a sailor, aged 27, was admitted into the Royal Southern Hospital on June 20th, 1873, with the following history. He had been fairly healthy until four years before admission, when he was seized with dysentery; ever since which he had been the subject of diarrhœa. During last winter he had suffered much also from cough and shortness of breath, but had not noticed swelling of the feet until a fortnight before admission. He has repeatedly had epistaxis, and has twice had intermittent fever, the last attack having occurred two and a half years ago. He is now very pallid, with puffy face and swollen feet and legs, is very short of breath, and complains of much weakness. The skin is thin, stretched, and shining. On an examination of the abdomen, the liver was found to be enormously enlarged, dulness extending in a vertical line from the right nipple downwards for 13 inches. The surface of the organ below the ribs was hard, inelastic, smooth, and painless. The spleen was also greatly enlarged. The girth of the abdomen at the umbilicus was 36½ inches.

He passed large quantities of urine of a pale straw colour, without a deposit, but occasionally slightly cloudy, with a specific gravity of 1·010 to 1·012, acid, and highly albuminous. He remained in the hospital for some time, taking, during the whole time until his discharge, 15 minims of liquor potassæ in water three times a day on an empty stomach, and having mainly a milk diet. He left, feeling much relieved, although the condition of the liver, spleen, and kidneys was apparently unchanged.

In this, and the case previously mentioned, the two being fairly illustrative of the disease, dropsy was either not very marked or absent. The large quantities of urine constantly voided, will, of course, account for this. The most trying symptom is weakness. The patient is languid, and incapable of any sustained physical exertion; but so long as he can sit or lie still, he rarely complains of any of the distressing symptoms which mark some of the other affections of the kidney.

It is not uncommon to find large hyaline casts in the light cloudy deposit of the urine that has been allowed to stand in a conical glass for an hour or two, but it almost as frequently happens that they are not present. At least, I have often looked carefully, but unsuccessfully, for them in cases about the nature of which there could not be the least doubt.

As the hope of curing this disease when it is at all advanced is but poor, it becomes the more important that the conditions which tend to favour, if not to cause, its development, should be well known, and, when possible, avoided. The two states which more than any others lead up to it are prolonged suppuration and syphilis. Some pathologists think that the latter affection is invariably an antecedent to, and therefore presumably a cause of, the disease. I do not think the evidence is as yet at all sufficient to warrant such a conclusion. For though there seems reason to believe that those cases are among the worst where prolonged suppuration, having its origin in syphilitic disease, especially of the bones, has existed, yet in other cases there has been nothing but a history of the prolonged antecedent suppuration alone, without any evidence of syphilis. Thus in the case of a woman, aged 38, the mother of ten children, who was for some time under my care in the Royal Southern Hospital, and who, there was every reason to believe, had not been the subject of syphilis, there had been for two years a discharge of pus from the abdominal wall, the discharge having originated, according to the patient's account, in the tapping of a cyst, probably ovarian, that time previously.

One great lesson which our knowledge of this disease should at any rate teach us, is the great importance of preventing, if possible, or early curing, suppurative discharges; and it is not too much to hope that, with the general adoption of the methods of treating joint-diseases, originated and practised with such remarkably successful results by Dr. Hugh Owen Thomas, of this town, together with the more extended employment of antiseptic methods in surgery, the frequency of albumenoid affections will be much diminished.

The morbid change constituting the lardaceous kidney is usually associated with a train of symptoms which render it easily recognizable. It is very seldom that the kidney is alone affected; for if the pathological change should commence in that organ, it is seldom long before others are involved in it. Thus the liver and spleen, as a rule, early participate in the morbid process; and as these organs can much more easily be made the objects of physical examination, and as moreover the physical changes wrought in them, and especially in the liver, are different from those brought about by any other pathological condition, their state affords an important collateral aid in determining that of the kidney. Suppose, for example, that a patient presents himself who is passing a considerable quantity of very albuminous, pale, urine, of a moderate or rather low specific gravity, and with little or no deposit, and that, on examination, the liver is found to be the subject of uniform enlargement, which imparts to it an unusual degree of density; that it is inelastic, smooth, painless, with a thickened, rounded, unindented margin, and that the enlargement is not associated with ascites or jaundice. Suppose, in addition, that the spleen is enlarged, and the patient himself non-dropsical, very anæmic, and, it may be, the subject of recurring epistaxis. Under such circumstances there can be little, if any, doubt that the condition of the kidney causing the albuminuria is that known as the albumenoid or lardaceous. Of course no two cases exactly resemble each other in detail, but the broad outlines are so similar, that such cases can generally be at once recognized and grouped in the same category. The association of cirrhosis with the lardaceous condition is that which perhaps produces the greatest deviation from the ordinary course of the disease.

This association was one which was believed to have occurred in the case of M. Robinson, a female, aged 54, whom I saw, with Dr. Nottingham, in the Southern Hospital, in June, 1872, and who was subsequently transferred to my care. The liver was very large and painless, and the urine abundant, though darker than it ordinarily is, and very albuminous. But instead of being smooth, the enlarged liver was distinctly nodulated. The patient left the hospital after a rather prolonged residence, apparently very much benefited, the medicinal treatment having consisted of the administration of chloride of ammonium in 15 gr. doses in infusion of calumba three times a day, and the local inunction of the iodide of potassium ointment, while the diet was carefully regulated, and consisted in great part of milk.

The order in which the organs are severally attacked, too, may be entirely different in different cases, the kidney in one being the first, and in another the last diseased, and of course under such circumstances there will be a great difference in the mode of development of the symptoms. For though there can be no question that in the vast majority of cases the albumenoid change affects several organs—the spleen, the abdominal lymphatic glands, and the liver, either simultaneously or in rapid succession—and that such a concurrent change forms often a material factor in the diagnosis, yet I do not think we are warranted in assuming, as has been done, that such organs are *invariably* affected together in each particular case that is of long standing, for I feel quite convinced that death may overtake the sufferer while as yet only one of them has been attacked. Ebstein * remarks that "later experience has taught us that this"—*i.e.*, albumenoid degeneration of the kidney—"is probably never absent in case of amyloid degeneration of the liver." While Bartels † remarks, "other organs besides the kidneys—the spleen, the liver, the abdominal lymphatic glands, the blood vessels of the mucous membrane of the intestines, as well as those of various other organs—are probably without exception the seats of similar degeneration."

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* Ziemssen's *Cyclopædia*, vol. xv. p. 610.

† Ibid, pp. 497—8

But I can positively state that I have seen at least on instance where, the liver and spleen being most markedl affected, the kidneys gave no reaction to the iodine test; and another where, the kidneys responding to that test with the utmost clearness, and in their general appearance resembling unmistakably lardaceous kidneys, the liver was to all appearance unaffected.

Thus on April 13th, 1878, I was present at the post-mortem examination at the same time of two patients, with the history of one of whom, as he alone had been under my care, I am familiar. He had been the subject of prolonged suppuration from the bones of the head and face, and when admitted was almost sinking from pulmonary disease, attended also by profuse suppurative discharge,—from two to three of the half-pint spitting-cups being quite filled with what had the appearance of pure pus during each 24 hours. He lived but a few days. At the post-mortem examination, vomicæ were found in the apices of both lungs, several of them lined by a distinct and somewhat thickened membrane, though generally the organs were not marked by the fibroid induration considered to be characteristic of syphilitic disease, which, I should also say, the man denied positively ever having contracted. The right and left kidneys weighed 3 oz. and 4 oz. respectively, and though the subjects of coarse disease, had not the appearance, and did not give the characteristic reaction with iodine, of lardaceous change. The liver and spleen, on the other hand, were typical examples of that condition. The former organ was very large, weighing 7½ lbs., smooth, cut with a waxy section, and assumed at once a deep mahogany tint on a solution of iodine being applied to it.

In the second case, while the kidneys were large, white, heavy, and free from fatty change, but reacting with great distinctness with iodine—a very great number of minute mahogany-red points and lines indicating the changed glomeruli and vessels—the liver was smaller than usual, quite limp and flexible, and gave no indication of the lardaceous change, or of any other marked deviation from the healthy condition.

In the former case, the urine, examined by heat and nitric acid in the ordinary way, had been found free from albumen during life.

We have yet to wait for complete elucidation of the etiology and pathology of this disease. Many facts have been accumulated, many guesses indulged in, and many theories framed. The facts remain, but the guesses and theories of to-day are different from those of even a short time ago. Dr. Dickenson no longer believes in the efficacy of free alkalies, under the idea that the lardaceous matter is de-alkalised fibrine.

It would, perhaps, be as well for the advancement of our knowledge if some of the statements made to-day were characterised by more of a spirit of scientific caution, and had less the stamp of finality than their authors give to them. Bertels remarks: "I can positively affirm that ulcerations of the intestines provoke amyloid disease more frequently than ulcers situated on any other mucous membrane, and this, indeed, independently of the etiology of the ulcer, which requires only to be of a chronic nature."* Notwithstanding this positive assertion, it must be admitted that lardaceous degeneration is an uncommon, rather than, as it would seem to imply, a common result of ulceration of the intestines. As might be expected, chronic dysentery is not an infrequent disease in Liverpool, whose commercial relations bring to it immense numbers of sailors from all parts of the world. I have now before me the records of thirty-one such cases, besides that of the one given on p. 115, which have been under my care in hospital since 1871. These were all typical and severe, and four were fatal, three on the second, fourth, and sixth day after admission respectively, from exhaustion; and the fourth from secondary abscesses of the liver, after prolonged treatment. Yet in no single instance, except the one detailed, was the urine found to be albuminous, though it will hardly be suggested that, in the absence of such a condition, lardaceous change in the kidney can be held to exist. The fourth fatal case was one in which it certainly ought to have been found if prolonged ulceration of the intestine could alone cause it. The patient had been three times in hospital during nearly two years, each time suffering from dysentery. His last admission was on August 11th, 1877, and he died on December 13th of the same year. The entire mucous tract, from ileo-cœcal valve to anus, was occupied by large, ragged, irregular ulcers, with raised and thickened edges, and with scarcely a trace of intervening healthy tissue; the right lobe of the liver contained one very large abscess, and the left lobe many smaller ones; but the kidneys were healthy, and, although frequent examinations had been made, there had never been discovered during life any trace of albumen in the urine. The relation between chronic dysentery and lardaceous disease of the kidney surely cannot be held to be very close when thirty-two unselected cases of the former only afford a single example of the latter, and that one the subject of prolonged malarial disease, independently of the dysentery.

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* Op. cit. p. 499.

Without venturing to say that the specific gravity of the lardaceous kidney is *always* high, I may state that whenever I examined with the view of determining this point it has proved to be so. The average specific gravity of the healthy adult kidney being about 1·054, that of the lardaceous organ has been 1·060.

While such pathologists as Wagner and Cornil on the one side, and Frerichs and Böttcher on the other, entertain diametrically opposite opinions on the question of which of the structural elements of an organ undergoing the lardaceous change are first attacked,—the former two maintaining that in the case of the liver it is always the vessels, the cells being only affected by "the pressure to which they are subjected in consequence of the thickening of the vascular walls," while the latter two believe that the cells can be proved to have undergone a recognizable change, while yet the vessels remain unaffected,*—we may be well content to wait for more light.

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* See an interesting discussion of this subject in the *Lancet*, July 6, 1878.

CHAPTER V.

CHRONIC DISEASE OF THE KIDNEY WITH LITTLE OR NO DROPSY.

IN the cases hitherto described, there was little, if any, room for doubt as to the organ primarily diseased. The dropsy, or albuminuria, which in all of them obtruded itself as a prominent symptom, would alone be sufficient to excite suspicion of either renal or cardiac derangement, a suspicion which would be easily confirmed or disproved by further examination. In other classes of cases, however, dropsy may be either entirely absent, or, if found at all, may exist in so slight a degree as not to excite serious apprehension in the mind of the patient, who is not aware, until some accidental circumstance leads to its being discovered, that he is the subject of advanced organic disease of the kidneys. To those who have not well considered this subject the above may appear an unwarranted statement. Yet it is quite certain, as will be abundantly proved in the succeeding pages, that the pathological condition known as cirrhosis, or granular degeneration of the kidney, may creep on so insidiously, and with such slight derangement of the general health, that the most arduous daily duties may be performed without any difficulty by those in whom it exists in an advanced degree. Indeed it may almost be said to be the rule that the physician is first consulted, when he is consulted at all, for one of the more obvious and troublesome secondary effects which the disease induces, and the presence of which proves that it is already firmly established, rather than for the disease itself; and that the patient expresses surprise, and sometimes incredulity, on being apprised of the true state of affairs. A troublesome cough, or nocturnal dyspnœa, or occasional vomiting, or headache, or the concurrence of all these, with, it may be, other symptoms, seems so naturally to point to other organs as to divert all suspicion from the real cause. What often misleads the patient is, that from first to last there may be no pain in the loins. Pain in this region is regarded in the popular mind as an inevitable accompaniment of kidney disease; and that any of the symptoms alluded to above should, in the absence of this presumably necessary one, lead to special enquiries concerning the urine, is often a matter of surprise. The more abundant micturition, especially during the night, which marks even the early stages of the disease, is thought to be but a natural result of the larger amount of liquid drunk, and, in the absence of any feeling of indisposition, seldom leads to the urine being examined. If, however, such an examination were made, strong evidence would be at once forthcoming, as I shall show, of the existence of the disease.

I must here also observe that anæmia, which is so marked an accompaniment of parenchymatous nephritis and albumenoid (or lardaceous) disease, may be entirely absent in this condition; indeed, so little may the disease affect the general health, that not unfrequently the patient, who has never even felt ill enough to consult a medical man, may die suddenly from apoplexy or uræmic convulsions,—struck down when in the apparent enjoyment of robust health,—and the disease be recognized for the first time on the post-mortem table. While, therefore, there is nothing in this affection absolutely antagonistic to anæmia, there certainly is no necessary connection between the two; and I believe that it is not unfrequently overlooked in consequence of the very general, but unfounded, belief among medical men that the anæmic state is one inevitably associated with all chronic disorders of the kidney.

I will now give cases illustrative of the chief symptoms, modes of death, pathology, and treatment of the disease.

CASE 21.—APOPLEXY. GRANULAR KIDNEYS.

James Oswald, a thin, pale, rather small man, aged about 58 or 60, was picked up by the police in a state of unconsciousness in the street on May 20th, 1876, and brought into the Royal Southern Hospital. He remained unconscious for two days. Intelligence then in some degree was restored, but he was unable to speak so as to be understood, and could not move the right arm or leg. Evacuations were passed under him in bed. There were unmistakable signs of considerable cardiac hypertrophy, without any evidence of valvular disease. Even in the absence of a complete history, it was felt certain that this patient was the subject of granular degeneration of the kidney, and that the cerebral apoplexy was probably a remote consequence of that condition. For a day or two he improved, and was at length able to raise the right leg, though the arm continued quite powerless. On the 27th he became again comatose, and died early on the 29th. At the post-mortem examination a large clot of dark blood was found in the left anterior cerebral lobe. It had broken up the outer third of the corpus striatum, and penetrated into the substance of the optic thalamus, but was outside the lateral ventricle, though only separated from it by a thin layer of brain matter. The cerebral arteries were the subject of advanced athermotous degeneration. The heart was much hypertrophied; the hypertrophy principally affecting the left ventricle. It weighed, when freed from blood, 1 lb. 3 oz. The kidneys were affected by red granulation. The disease was more advanced in the right than the left. The surface of this, the right one, was nodulated, and marked by abundant fine veins. The structure was apparently not tough. The cortical portion was obviously much diminished; and the capsule very adherent. The specific gravity of the entire organ was 1·021. The left kidney had the same characters in a less advanced degree. Their weight was 5 oz. for the left, and 7 oz. for the right. The microscopical structure, which was the same as is usually found in such cases, will be alluded to presently. I may draw attention here to the fact that the organ, so far from displaying an increased toughness, appeared to be quite soft and flabby, and presented a marked contrast to the hard and resisting structure of the kidney of chronic heart disease, attended with long-continued dropsy. In that condition there is, with an apparent diminution in bulk, a high degree of hardness, accompanied, however, as in the present case, with a diminished specific gravity. I cannot help thinking that, in describing the cirrhosed kidney as invariably a tough kidney, as is often done, writers may have been misled by its supposed structural resemblance to cirrhosed liver, which undoubtedly is always tough. I admit that the structure often does not feel so loose and flaccid as that of the normal organ, but when the true test of toughness, the capability of resisting strain, is applied, it will often be found less and not more tough than the latter. Of this I shall give evidence further on. The amount of blood effused was very considerable, and this case adds another to the very numerous exceptions to the supposed rule that in cirrhotic kidney cerebral hœmorrhages are small.

The urine could not be saved during life, and as the presence of albumen in that which is found in the bladder after death affords no evidence of the patient having had albuminuria, the fact of its being very albuminous in the present instance was of no value. But when examined microscopically, the urine was found to have many fine apparently granular casts; and I am not aware that these, or casts of any other kind, are ever found in the urine contained after death in the bladder of anyone not the subject of kidney disease. Neubauer gives a drawing, taken from Funke's Atlas, of epithelial casts from the post-mortem urine of a patient who had died of typhus fever (fig. 4, pl. 1, Syd. Soc. Edition of Neubauer and Vogel), but it is not said whether there was independent kidney disease, or whether, as is often the case in typhus, albuminuria had existed during life.

CASE 22.—APOPLEXY. DEATH IN A FEW HOURS. VERY ADVANCED RENAL DISEASE.

Henry Baldwin, a hale-looking old man, whose age afterwards was found to be 64, was brought in by the police, who found him in an unconscious state, on May 27th, 1878. I saw him not long after his admission. He had the appearance of a thoroughly healthy labouring man, well nourished, muscular, and with a wholesome ruddy colour, showing through the bronzed groundwork of his sunburnt cheeks. His head was closely covered with short dark brown hair, not even tinged with grey; the hands were hard and horny from work; the finger ends not clubbed, and the whole man so strikingly healthy in appearance that I was not surprised subsequently to hear that he was never known to have consulted a doctor in his life, and that until the moment he was struck down by apoplexy he had been working every day with the strongest.

He was profoundly unconscious, breathing slowly, regularly, and without stertor; pupils contracted, the right more than the left; eyelids closed, the right more completely than the left; limbs in repose. The pulse was 62, regular, and quite free from abnormal tension. There was no accentuation of the second sound at the aortic cartilage or elsewhere. No bruit. The apex beat was most pronounced exactly one inch vertically below the left nipple. There was no very obvious increase in the amount of præcordial dulness. A catheter introduced into the bladder drew off 26 ounces of clear, pale, acid urine; specific gravity, 1·013 when cold, containing a very small quantity of albumen, and on analysis yielding but ·5 per cent. of urea.

The diagnosis made was advanced renal cirrhosis; hypertrophy of the left ventricle; apoplexy into one or both ventricles. Prognosis, very early death. With some difficulty his name was discovered, and the attendance of his friends secured just before his death, which happened 14 hours afterwards.

Autopsy 12 hours after death. Rigor mortis pronounced. Brain: vessels of the base atheromatous; blood in great amount in all the ventricles. Though the site of rupture could not be made out, the hæmorrhage appeared first to have invaded the left lateral ventricle, and thence to have passed to the 3rd, 4th, and right lateral. The left corpus striatum and right optic thalamus were torn—the first almost broken in two, and the brain matter above the ganglia extensively ploughed up. Chest:

lungs, healthy; heart, large; weight, 22 oz.; valves, competent. Patches of atheroma through the aorta; hypertrophy of left ventricle only; its wall 1$\frac{1}{6}$ inch thick; its muscular tissue browner and softer than normal, and easily torn. A fragment cut from the centre of the wall was examined microscopically. The striæ were generally well marked, but running longitudinally along the axis of many of the fibrillæ were lines of minute refracting dots. On dropping rectified ether on the slide, and then putting on the covering-glass and examining, the field became crowded in parts by oil drops of various sizes. There was no doubt, therefore, of fatty degeneration of the wall of the ventricle. I mention this because I believe the tendency to it, which is universal in these cases, should have an important influence on practice. 15 grammes of the muscular tissue of the left ventricle were macerated in absolute ether for 24 hours, the ether poured off and evaporated, when an oily residue was left, weighing ·68 gramme. Though not wholly fat, this residue was nearly so, as the microscope demonstrated.

The abdominal wall was lined by a thick layer of fat. Liver apparently healthy. Kidneys remarkably changed. They seemed at first sight to be entirely converted into a bunch of cysts, of which there were hundreds in each. The cysts varied in size, one of the largest containing 2½ oz. of clear fluid; between which, and those not larger than the head of an ordinary pin, every gradation was found. The majority contained a clear limpid albuminous fluid. The contents of a few, however, were slate-coloured and pultaceous, and, together with much pus, contained a large number of spherical bodies, having the microscopical appearance of leucine.

The fluid in the largest cyst had a specific gravity of 1·014; was neutral; had much albumen; and yielded only ·1 per cent.

of urea. It differed very much, therefore, from the urine: in many parts what of kidney structure remained was quite gritty from deposited crystalline matter, which appeared as lines and dots, and in one part as a calculus, as large as a horse-bean. These deposits were not confined to the pyramids. They occurred as lines only in that portion, but as little irregular masses in the remains of the cortex also. The calculus was very dense in structure, and, when the exterior was scraped off, of a very light brown colour. A portion pulverized was readily dissolved by liquor potassæ, and a drop of acetic acid, added to the solution, led to the precipitation of innumerable minute lozenge-shaped crystals. A second fragment acted on by nitric acid, which dissolved nearly the whole of it with effervescence, then dried, and submitted to the vapour of ammonia, yielded muroxide. The calculus was therefore uric acid.

There are several points of practical interest about this case, Thus I have heard it publicly stated in a discussion on venesection in uræmia, that if this were only practised on patients who were not anæmic, it would not be practised at all, as all patients with chronic Bright's disease *were* anæmic. Yet the patient whose case I have just detailed was to all appearance a type of robust health, though the disease must have existed for years. I had careful inquiries made of his relatives, who stated that they had never known him have a day's illness, and that he went out with his cart without any complaint whatever on the morning when he was struck down by apoplexy. Other instances of the same kind will be given; and in confirmation of my own experience in this matter, I shall quote to the same effect from Bartels. It happened also that, on the very day of this man's death, another patient, named William McLeod, an American sailor, was admitted complaining of dyspnœa, arising from bronchitis, in whom the very large quantities of pale, specifically light, slightly albuminous urine, the great amount of cardiac hypertrophy, without valvular disease, the very high arterial tension,* and the faintest trace of œdema were unmistakable evidences of the prolonged existence of this disease, and yet he was one of the most robust-looking men that one could possibly see, with strong, powerful limbs and a sunburnt, healthy-looking face. The state of his nutrition may be judged of from the following facts. The girth round the middle of each upper arm, which was entirely free from any œdema, was 12½ inches when the biceps was uncontracted, 14 inches when it was contracted, and that of the chest at the level of the nipple, 38 inches. The height of the patient was 5 ft. 5½ in.

A second point of interest in the case was that, though there was evidence of cardiac hypertrophy, there was neither abnormal tension in the radial artery, nor any accentuation of the second sound. The absence of these signs was explained, firstly, by the fatty condition of the ventricular walls, and, secondly, by the bleeding which had occurred into the brain, which was probably sufficient to lower the general blood-pressure considerably, even though the pressure of this very blood served, to some extent, to obstruct the cerebral circulation and, *pro tanto*, to throw greater stress on other parts of the circulatory system.

Thirdly, I think the tendency to, and possible existence of, fatty degeneration of the hypertrophied ventricle should never be lost sight of in its bearing on the question of venesection.

In the above cases post-mortem examination revealed the exact condition of the kidneys. In the following, though there was no autopsy, the clinical history, as well as the mode of death, left no doubt as to that condition being essentially similar.

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* The sphygmometer, which gave a pressure of 800 grammes, failed to obliterate the radial pulse.

CASE 23.—DYSPEPSIA AND DYSPNŒA. RENAL CIRRHOSIS. RELIEF TO SYMPTOMS. SUBSEQUENT SUDDEN DEATH FROM APOPLEXY.

In the spring of 1875 I attended, in consultation with Dr. F. C. Evans, Mrs. F. She was a tall, fine, well-developed woman of about 50 years of age, and had generally enjoyed fair health. For some considerable time past, however, she had been ailing. The breath had become shorter than usual, and the feet had commenced slightly to swell. She complained a good deal of cough, and of constant dyspepsia, associated with much painful flatulent distension. The lungs presented no indication of mischief. The heart was, however, the subject of considerable hypertrophy, but gave no evidence of valvular disease. Its apex beat was carried downwards and outwards very considerably, and the impulse was diffused and powerful. The radial pulse was hard and resisting, and required great pressure to obliterate it. On examining the urine, which was passed in fair quantity, it was found to contain albumen, though not to a large extent, and to present a number of small semi-transparent casts, which in places were dotted with minute refracting specks as of oil. There was as well a quantity of bladder epithelium. Though the patient did not think herself ill enough for the treatment, we prescribed temporary rest in bed, diaphoretic medicines, with occasional purgatives and a rigidly milk diet. The œdema soon disappeared, and her general health improved so that after a time she went with her family to a watering-place. On June 26th, 1875, not very long after her return home, much improved in every respect, I was hastily summoned to see her, with Dr. Evans. We learned that while in the water-closet at 11.30 a.m. she had suddenly, but without any impairment of consciousness, lost the use of the left side, and that she had with difficulty been removed to bed. We saw her at 2.40 p.m. She was then lying on her back, with her head slightly raised. The face was flushed, and she was complaining of very severe pain on the right side of the head. The limbs on the left side were perfectly powerless, and the cheek *on the same side* had lost sensation and the power of movement. There was neither ptosis nor strabismus, and the pupils acted. The pulse was 76, full; the respirations deep and rather slower than natural, with occasional sighs. Everything given had been instantly vomited. She answered all our questions quite correctly, but, in spite of the pain in the head, was feeling drowsy. We had ice applied to the head; enjoined perfect quiet, and prescribed an effervescent saline. The drowsiness deepened into coma, and she died on the evening of the following day.

This is a very common termination of Bright's disease in which the kidneys have undergone contraction. The fact is so well known as scarcely to need its being noticed, that the muscular coats of the smaller systemic arteries become usually greatly thickened during the progress of this affection, and that the heart also becomes sometimes enormously hypertrophied, without any alteration in the structure or size of the valves. But while the arteries generally, by being thus thickened, are able to resist the extra pressure to which they are subjected from the powerful action of a much enlarged heart, those of the brain are frequently the subject of degenerative changes which render them weak. This diminished power of resistance on the one hand, and the increased strain to which, in common with the vessels of the body generally, they are subject on the other, renders them more than ordinarily liable to rupture, so that it is not remarkable that death from apoplexy is very common; and it is a matter of special moment with the physician to warn his patient against everything that would favour the occurrence of an attack. He will take care to have the surface of the body protected against chills by means of flannel worn next the skin; to warn the patient against indulging in the irrational practice of sleeping in a cold bedroom during the winter when he is able to have a fire, which practice, notwithstanding that many men and women past middle age are every winter found dead in their beds in the morning through indulging in it, patients will obstinately persist in following, under the strange belief that it is healthy; to warn him also against straining of every kind, and especially against straining at stool; to advise early and regular hours; simple habits; light and digestible food, and moderate exercise always short of fatigue; and where patients follow such judicious directions, and do not foolishly hang their hopes merely on medicine, their lives may often be, without doubt, much prolonged.

The dyspnœa, without any evidence of morbid change in the lungs, was a striking symptom here, as it often is, amounting sometimes to a distressing asthma in cases where the kidneys are becoming contracted. Where asthmatic attacks have come on in persons at or beyond thirty, without any hereditary tendency to them or any very obvious cause, it is always wise to make a very careful examination of the urine, when its large quantity, low specific gravity, and, it may be, slight amount of albumen may direct the attention to the true cause.

The dyspepsia too from which our patient suffered is one of the most troublesome symptoms in such cases, and often requires the nicest management of diet before it can be subdued.

When speaking of treatment I shall offer some remarks on the question of diet.

But other complications than those of bronchitis and dyspepsia, and other modes of death than by cerebral apoplexy are common in this form of disease. The following case will illustrate some of these.

CASE 24.—PERICARDITIS. ALBUMINURIA. PURPURA. OBSTINATE VOMITING. CONTRACTED KIDNEYS.

On September 1st, 1874, Jane Case, aged 34, a pale, thin, over-worked woman, was admitted under my care into the Royal Southern Hospital. She was much exhausted and had an extremely anxious careworn countenance. Speaking in whispers, she said that for some time past she had been in the habit of vomiting every morning on waking, and that there had been a slight swelling of her feet. She was lying on her back with her head very low, breathing slowly and regularly, without the slightest dyspnœa. Yet on examining the heart a distinct though soft to-and-fro sound was heard, the effect of existing pericarditis. The pulmonary sounds were normal. On the thighs and legs there were a number of large purpuric patches. The left foot and ankle were slightly, but the right ones not at all, swollen. She was said to be passing but little urine—only 8 oz. during the first 24 hours; but then she was repeatedly vomiting fluid, and that not only when any attempt was made to administer nutriment, *but frequently at other times also*, when, so far as matters introduced from without were concerned, the stomach should have been empty. The urine was pale; sp. g. 1·011, and contained abundance of albumen; but a very careful examination failed to detect any casts. The amount of urea was determined by Liebig's process. It amounted to but 16 grains per 1000. It seemed probable, therefore, that this substance was being eliminated through other channels, as there were at that time none of that group of symptoms present by which the so-called uræmia is recognized, if we except only the constant vomiting. Thus the skin was cool and not perspiring, the pulse, temperature, and respirations were normal, there was perfect consciousness, and no urinous or ammoniacal odour. The fluid ejected in such abundance from the stomach was brownish in colour, and had a specific gravity before coagulating the albumen, of which it contained a large quantity, of 1·013. In consequence of the deficiency of urea in the urine, and its non-elimination through the skin, and yet the absence of uræmic poisoning, I carefully examined this vomited matter for the first-named substance, the process employed being similar to that used in case of the urine, and found 16·5 grains per 1000. Nutrient enemata were ordered, all of which were retained. An effervescing saline was prescribed, and subsequently, on the 7th, after a day's intermission, during which no medicines were administered by the mouth, half-minim doses of carbolic acid combined with a little glycerine and water. The vomiting continued incessantly up to the afternoon of the 7th, when it became moderated, ceased as the evening wore on, and did not recur during the remaining day of her life. A very free motion was passed on the 6th. On the 7th, as the bladder seemed to me to be distended, I had a catheter introduced, and 44 oz. of urine, of exactly similar character to that previously passed, were drawn off. Her pulse at that time was 52, and her respirations but 12 in the minute. She was perfectly conscious but extremely exhausted. On the following day she could neither speak nor swallow. The nutrient enemata were all retained. She grew weaker and died in the evening.

On making an examination 24 hours after death, the kidneys were found to have undergone great contraction. The weight of the two together was only 4 ounces. The capsules were adherent, and the surface of the left one was nodulated, that of the other being almost smooth. Their colour was grey, both superficially and on section. The main diminution was in the cortical portion, which had almost wholly disappeared. The cardiac surface of the pericardium was roughened over with recent lymph, and the cavity contained 1½ oz. of turbid serum. This fluid was not examined chemically, but in other instances where I have examined the serous fluid discharged from the skin after punctures made to relieve the dropsy of kidney disease, I have failed to discover any but slight traces of urea. The heart itself was not hypertrophied.

This patient was comparatively young. The disease, however, was manifestly of very long standing; and yet cardiac hypertrophy had not resulted as it generally does. There was no special fear, therefore, of death from apoplexy.

Another series of complications, however, unfortunately too common in such cases, develop themselves, viz., inflammation of a low type of the serous and mucous membranes. The pericardium was the serous membrane affected, and it is not a little remarkable that though this membrane was the subject of an inflammatory process, as indicated by the rub during life and the presence of soft and recent lymph after death, there was never any quickening of the pulse, and the patient was able to lie flat on the back, with the head low, and without the least dyspnœa. The inflammatory or sub-inflammatory condition of the mucous membrane of the stomach, a condition extremely common not only in this but in other forms of chronic kidney disease, was manifested by her habit, of long continuance, of vomiting mucus every morning, and by the more frequent vomiting which characterised the last few days of her life. That this vomiting was, to a great extent, excited by the presence of urea was very probable, from so large a proportion of that substance being found in the matters ejected. But the gelatinous character of the fluid was exactly that of the vomited matter in chronic catarrh of the stomach.

One of the features of uræmic vomiting, of which this case presented a marked example, is that it occurs when the stomach is empty of food. Speaking of the character of the vomited matter, Bartels says: "I have never been able to discover urea in it."* In the above case I certainly discovered it in large quantity.

Hæmorrhages of one kind or another are extremely common in the advanced stage of contracted kidney. In this patient there were large patches of ecchymosis over the lower extremities. In others there is epistaxis, hæmatemesis, or hæmoptysis. And frequently there is hæmorrhage into the retina and brain.

Where the kidneys have undergone the changes which had affected them in the cases now being detailed, i.e., where they have become more or less cirrhosed and contracted, there may or may not be dropsy, the rule being that for a long time there is little or none, and the urine may at one time contain a very small and at others a moderate quantity of albumen, but never in unmixed cases so large a proportion as is found in the different forms of the so called parenchymatous nephritis. The contracted kidney is generally found in patients who have long passed puberty, and more often, perhaps, in those who have reached or even passed middle age; but I have had the opportunity of seeing at least one example where the patient had not yet attained adult life. The case was that of John Tucker, a shoeblack, aged 13, who died on May 8th, 1871, in the old Southern Hospital, a post-mortem examination being made on the following day. The morbid specimens were exhibited by Dr. J. Cameron, under whose care the patient had been, at the meeting of the Medical Institution on the 11th. The kidneys were very small, red and granular, while the heart was enormously hypertrophied, and without valvular disease.

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* Op. cit. p. 425.

While, therefore, the opinion expressed by Sir W. Gull and Dr. Sutton, that contracting kidney "is a disease of old age,"* is perhaps generally correct, it certainly is not invariably so.

An extraordinary example of the amount of contraction of which both kidneys may be the subjects—and that, too, in one who has not attained old age—is given in *Le Progrès Medical* for June 16, 1877. The case was that of a woman, aged 46, a patient in the Lariboisière Hospital, under the care of M. Jaccoud. She was admitted on February 14, 1877, and died on the 15th of the following month. The disease must have been very chronic, as she had been under treatment for a similar affection, in the same hospital, in 1875. The principal features and symptoms in the case were a very cachectic, pallid appearance, slight dropsy of the lower limbs, but a good deal of palpebral œdema; extreme feebleness; habitual dyspnœa; anorexia and persistent vomiting, even when no food whatever was taken; absence of diarrhœa; cough and abundant expectoration. The urine, at first from 600 to 700 grammes in the 24 hours, very slightly albuminous, with the normal proportion of urea, fell after some days to 300 grammes, and even less, the specific gravity all the time remaining low, viz., from 1·008 to 1·012. There was very little albumen. For five days preceding death the quantity had fallen still more, till at last it reached scarcely 200 grammes in the day, the specific gravity being at the same time reduced to 1·006. During this time the patient was in a state of somnolence. Each kidney only weighed 41 grammes, or a little over 1¼ oz. Its length was 9 and its breadth 4 centimètres (3⅓ and 1⅓ in. respectively). It was of a firm consistence and red colour: the capsule was adherent, and the cortical substance very greatly atrophied. Bartels gives one where the measurement of the right kidney was even less, that of the left being slightly greater; while Wilks and Moxon mention a case where they weighed "only one ounce and a half" (*Path. Anat.*, 2nd Edit., p. 408); but they leave it uncertain whether this was the weight of each kidney or of the two together; nor do they say anything of the size or age of the subject of the disease; and we know that, exceptionally, this affection occurs even in children.

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* Med. Chir. Trans. 2nd Series, vol. 37.

In further illustration of the varied clinical features of this form of disease, and of the changes of which the urine is the subject, I give the following cases.

CASE 25.

On August 17th, 1874, I received from N. S. Glazebrook, Esq., a specimen of urine passed by a gentleman under his care, whose case, as the note accompanying the urine informed me, was the subject of great difference of opinion. The patient was aged 52, and had been gouty. He was passing a large quantity of urine, and was very weak, although stout.

Such was the information conveyed to me. The urine was very pale, slightly acid, had a specific gravity of 1·010, contained no albumen, but was remarkably deficient in urinary solids, even when allowance was made for the large quantity passed. Thus, the urea only amounted to ·6 per cent. The microscope gave no information bearing on the disease. There were no casts.

I was asked whether, from an examination of the urine, I could venture to say whether there was any derangement of the kidney, functional or organic. In my reply I stated my belief, founded mainly on the deficient eliminating power of the kidney as shown by the very small proportion of urea contained in the urine, that there was advanced disease; that probably, though no albumen was present then, it would be found sooner or later, or had been present at an earlier stage of the disorder; that the kidney had undergone a great degree of contraction; and that very great care would be required, as the autumn and winter drew on, by guarding the skin against cold, and other common-sense precautions, to protect the patient from the danger of apoplexy.

Five months later I received another sample of the same gentleman's urine from Mr. Glazebrook, with the request that I would see the patient with him on the following day. The character of the second urine was not substantially different from that of the specimen which I had previously examined, except that it contained an *appreciable quantity of albumen.* When I saw the gentleman, the correctness of the opinion which I had formed from an examination of the urine was abundantly confirmed, for there was so high a degree of resistance in the radial pulse as to indicate great hypertrophy of the muscular coat of the artery, and, corresponding with this, a very considerable hypertrophy of the heart itself. There was no valvular disease, yet the apex beat was carried downwards and outwards, and every systole was marked by a heavy stroke, conveying the impression of an unusually powerful impulse against the chest-wall. The patient had been the subject also of continuous headache, which had only been relieved by a rigid adherence to milk as a diet, and an entire abstention from meats. Occasional attacks of eczema of the legs occurred, which ran a chronic course, and then temporarily disappeared, only to appear again.

The abundant flow of urine, of very low specific gravity, now without and now with a slight quantity of albumen, the cardiac hypertrophy, the high-tension pulse, the absence of dropsy, the continuous headache, and the obstinate eczema, seemed to me to leave no room for doubt as to the nature of the disease from which this patient was suffering. This concurrence of eczema, or some chronic vesicular or scaly skin disease, with renal cirrhosis, is not uncommon. Another example of their concurrence is given in Chapter viii. The effect of a careful regulation of the diet in the above case was very striking. When meat was taken there was obstinate and severe headache; while, so long as the diet was limited to milk, this distressing symptom entirely disappeared. The patient consulted, I believe, a great number of physicians, in London and elsewhere, and died early in 1878. The period when there was no albumen in the urine was one of absolute rest. Under such circumstances it may occasionally temporarily disappear.

The following cases illustrate very well the insidious nature of the disease.

Case 26.

J. R., a carter, aged 37, was admitted into the Royal Southern Hospital, under my care, on May 16th, 1876, suffering from delirium tremens. He was a stout, strongly-made man, with a big head, and stolidly-determined countenance. His face was pale and large, but not œdematous. We were told that, though respectably connected, he could not be persuaded to abandon drink, but that he followed this as he did everything else, with a quiet, undeviating doggedness of purpose that nothing could influence. By a combination of chloral and bromide of potassium, in moderate doses, with a nutritious but unstimulating diet, the delirium was shortly subdued, when some further account could be obtained from himself of his history. The lungs were normal, but the marked evidences of cardiac enlargement, without any indications of valvular disease, led to a close examination of the urine. It was found to be very abundant—from 60 to 72 oz. in 12 hours;—specific gravity, 1·005 to 1·008; pale; neutral; with a slight mucous cloud, but without reacting for albumen to the ordinary test of heat and nitric acid. The pulse was decidedly hard and incompressible. There was no swelling of feet as he lay in bed, but after being up for a day or two slight œdema of the ankles made its appearance. It was extremely difficult to obtain information from one so stolidly stupid as he seemed to be; but after a while I learned that he had had several fits of late years, one about two months before coming to hospital. After his delirium had been subdued, the chloral was omitted, and diluted nitro-hydrochloric acid in the compound infusion of gentian administered to him three times a day, with occasional simple aperients, so long as he remained in the hospital, the diet being mainly one of milk, and altogether free from stimulants, and great care being taken to maintain warmth to the surface. On one occasion the quantity of urine suddenly fell from 96 to 19 oz. in the 12 hours, the specific gravity at the same time falling from 1·012 to 1·005; and I was afraid of a recurrence of one of his "fits." The next day, however, a large quantity was passed. He remained in hospital until June 10th, constantly craving for beer, and at length leaving because he was not allowed to have it. The urine when he left had a specific gravity of 1·008, and was still very abundant—50 oz. in 12 hours.

There was no indication of albumen, by the test employed, in this patient's urine; yet there is no doubt whatever that he was suffering from advanced kidney disease of a granular character. The cardiac enlargement, without evidence of valvular disease; the resisting pulse, the large quantity of pale urine of a very low specific gravity, the stolidity and stupidity of manner, and the history of recent epileptic seizures, made this certain, even though there was but slight temporary œdema, and at that time, and to the test employed, no albuminuria; and with the determination to pursue his course of drinking unaltered, notwithstanding the plain warnings that were given to him, there can be very little doubt that his career will not be a long one.

CASE 27.—BRONCHITIS. RIGHT PLEURITIS. ADVANCED CIRRHOSIS OF KIDNEYS.

John Conway, a man of colour, aged 49, seaman, was admitted into the Royal Southern Hospital, under my care, on February 20th, 1878. He had been perfectly well and constantly performing, without difficulty, his duties as an able-bodied seaman up to twenty days before admission, when he was attacked with cough, severe pain in the right side of the chest, and shortness of breath. This last symptom has always been worse at night, so that he has been unable to lie down at all any night since the onset of his illness. So far as he knew, he had never suffered from any illness, except small-pox, which he had had severely 23 years ago, and, as a consequence of which, he had lost the sight of the left eye, and was rather deeply scarred in the face. He did not remember being ill a single day since. His habits had been temperate, so far as intoxicating drinks were concerned, but he had been a great drinker of tea, disposing of from half a gallon to three quarts of this beverage regularly every day for years.

He complained of severe pain beneath the right nipple. No rub was heard; but there were coarse râles over the whole of that side of the chest, the respiration on the left side being much more natural. Respiration, 32; temperature, 98·4° F.; pulse, 98, regular, of markedly high tension. The heart was greatly hypertrophied, the apex beat carried downwards and outwards, two inches below and outside the nipple, and the area of dulness notably increased. The second sound was strongly accentuated at the second right cartilage, the sounds otherwise being normal. There was a small amount of œdema of both feet; and on the left leg a large superficial ulcer, caused by the blow of a stick during one of what he termed "the larks" with which he and his comrades were accustomed to while away their time on board. He appeared to think nothing of this, and evidently would not have considered it alone a sufficient reason for going off duty. He could not work in consequence of pain in his chest, cough, and breathlessness, and had no idea that anything else was the matter with him.

During the first 12 hours after admission, he passed only 8 oz. of urine. It was neutral, specific gravity 1·014, contained no deposit, had abundance of chlorides, and albumen in moderate quantity (about $\frac{1}{6}$ of the space).

The diagnosis was bronchitis, right pleuritis, and advanced granular degeneration of the kidneys, and when he was sufficiently well to admit of it, he was often made the subject of demonstration to the pupils, and the difference between the symptoms in his case and that of Coffey—who was in the hospital at the same time—with the probable difference of the two cases to account for that difference of symptoms, pointed out. Thus, by a comparison with other patients, the accentuation of the second sound, the increased dulness, and other signs of hypertrophy of the left ventricle, the high-tension pulse, &c., were made very striking.

The man was a cheerful fellow, light-hearted even in the midst of his sufferings, and, when better, looking back on and talking of his sailor life with evident pleasure; not at all the sort of man, one would think, to nurse a secret grief, and certainly not one to give colour to the notion expressed by Dr. Clifford Allbut, that "carking care" is a potent cause of cirrhotic disease of the kidney.

It is worth while remarking also that his head was very thickly covered with crisp curly hair, without the least bald spot anywhere, and that not only the hair, but the skin and body generally were well nourished. The nutrition of the tissues, therefore, had evidently not been impaired, though, obviously, the disease was of very long standing.

The sight of his single sound eye was remarkably good.

The following treatment was ordered:—Milk diet. A bed near the fire. Sinapisms to the right chest, to be followed by linseed-meal poultices, and every fourth hour a mixture containing small doses of vin. ipecach. and compound camphor tincture, with syrup of Tolu. During the first day he had several severe attacks of dyspnœa of a spasmodic character, to relieve which three doses, each containing 1 drachm, of ozonic ether were administered.

On the 22nd, it was noted that he had passed a pretty good night, having slept moderately well, and that his breath was easier. He went through that day well. Late in the evening, however, while making a visit to another hospital patient, I was told that he was dying. I went to him immediately with the house-surgeon and a pupil, who was present, and to us, as well as to the ward-sister, he certainly appeared to be dying. His hands, arms, feet, and legs were quite cold, the breathing laboured and very difficult, and he seemed to be unable to speak. I directed that his extremities, including his hands and feet, should be wrapped at once in hot cotton-wool, a hot-air bath employed, and a drachm of ozonic ether in acetate of ammonia mixture administered every hour. The next morning he was better, and after a fortnight was able to be up, and first of all wheeling himself, and later on walking into the grounds to enjoy the sunshine.

When the ship in which he had arrived was ready to sail, he had been up and about for some time; but, on being consulted, I declined to give my consent to his joining it, leaving the responsibility of his going with the captain and himself. He decided to remain.

The daily urine averaged from 80 to 120 oz.; its specific gravity from 1·007 to 1·018. Except on one occasion, it was always slightly acid; and with one exception, after the first few days, also (March 6th) was noted as having either a trace or a slight amount of albumen. The testing on this occasion, of supposed absence of albumen, was by boiling and adding nitric acid, and was, therefore, as I have explained elsewhere, not thoroughly reliable for the detection of small quantities in this disease.

He went through the whole of March well. The slight œdema of the feet had altogether disappeared, and under careful dieting and attention to the skin and bowels he seemed fairly well, and if he had lived in or near the town would have been dismissed.

The only uræmic symptom, if such it could be considered, was nocturnal dyspnœa. Nearly every night, at about nine o'clock, he had an attack—sometimes very slight, at others very severe. I was able to examine him on one of these latter occasions, when (on paying a late visit to another patient) I found him sitting beside his bed, afraid to get into it; his hands on his knees, his shoulders raised, and he himself making painful efforts to breathe. Yet there was no bronchitis, and air entered the lungs freely. It seemed obvious that the fault lay, not in the air-cells or bronchi, but in the pulmonary vessels. The blood not passing freely to the air-cells, the sensation was the same as if air had been cut off from contact with the blood-vessels. The ward-sister observed to me that he was invariably worse if he indulged a little too freely in eating. I made him inhale three minims of nitrite of amyl. This gave him much temporary relief; but ten minutes after its employment he vomited, the vomiting giving him still more relief. That which always gave him the greatest ease, however, and for which he used to beg whenever subsequently a severe attack came on, was the ozonic ether. Nothing afforded relief a all comparable with this, and the relief not only was speedy bu lasted a long time, and if he thought he was going to have an attack he would ask for it, the attack being generally warded off.

On April 5th he was not so well. There was rather abundant muco-purulent secretion, and loud râles were audible over both sides of the chest. His respiration was hurried, and the pulse quickened. On the 6th there was a sudden and alarming reduction in the amount of urine, only 12 oz. having been passed, though he had drunk 65 oz. of liquid, and the skin was not actively perspiring. This urine was accidentally thrown away after having been measured. There were no additional uræmic symptoms however. On the 9th, the quantity of urine having again fallen to 16 oz., the fluid drunk being 59 oz., a hot-air bath was administered. This caused him much distress for a time, but induced copious perspiration. Respiration, 39; pulse, 112. During the next four days he had occasional vomiting, and became much changed in manner. From being cheerful, tractable, and good-natured, he grew obstinate and self-willed. He had always been scrupulously clean. Now he began to spit on the floor beside his bed, and after the 11th he could not be dissuaded from spitting into the urine, so that no examination of it could be made subsequently. He began to wander in mind occasionally. On the 14th the pulse was 100, compressible. Up to that time it had been tense and resisting. On the 16th only 8 oz. of urine were passed. Specific gravity, 1·015. Still there was no œdema, and the vomiting had now ceased.

On the 19th only 4 oz. of urine could be saved, and he did not pass much more. He was but slightly delirious, and always answered questions rationally when addressed, wander-ing off occasionally, and muttering to himself incoherently when left alone. There was no violent delirium and no eclampsia.

On the 21st only 1 oz. of urine was passed. He appeared to pay very little attention to what was passing, but did not appear to be sleeping, though drowsy, for he replied when spoken to, but immediately became quiet and seemed to desire to remain so. He died quite suddenly, at dinner-time on the 22nd, a few minutes after he had been replying to a question from the ward-sister. She sent a nurse to him with some milk, when she found him dead.

The treatment during the latter period of his illness had been 5 gr. doses of carbonate of ammonia, in acetate of ammonia mixture four times daily, followed by warm drinks, the ozonic ether when he was threatened with or suffering from spasmodic dyspnœa, warmth to skin, and occasionally a draught at night containing 5 minims of tincture of digitalis in camphor mixture.

Frequent examinations of the urine were made, mainly with the view of determining the amount of urea. Thus, taking the days immediately before and immediately after his relapse, the following table will show the chief particulars. After the 11th it was impossible to rely on it, as he could not be made to understand that he must not spit into it.

Date.	Quantity.	Specific gravity.	Per-centage of Urea.	Total Urea in grns.	
April 4	50 oz.	1·015	1	232	about.
,, 5	52 oz.	1·015	·9	217	,,
,, 6	*12 oz.				
,, 7	24 oz.	1·018	1·54	172	,,
,, 8	54 oz.	1·015	1·35	339	,,
,, 9	16 oz.	1·017	1·59	118	,,
,, 10	18 oz.	1·018	1·8	150	,,
,, 11	20 oz.	1·018	1·8	167	,,

* This urine was accidentally thrown away.

Some of the matter vomited was filtered and examined. I[illegible] was acid; specific gravity, 1·018; was slightly albuminous and, by Russell and West's method, gave nitrogen corresponding to ·25 per cent. of urea. But I am bound to say that, as the examination was not made until after two days, but little value can probably be attached to the result.

Autopsy 24 hours after death. Right lung somewhat œdematous. Both it and the left bound down by adhesions.

The heart was large. It weighed 1 lb. 5 oz. when freed from blood. The valves were competent, but had a few degenerated spots on their surface. The muscular tissue was firm. The hypertrophy affected the left ventricle only, the wall of this chamber being 1 in. thick.

The specific gravity of the blood had undergone a most extraordinary degree of diminution, that of a portion taken from the vena cava being only 1027·6. Though I mention this, it is so extraordinary that I cannot help suspecting that I must have made some mistake—at least, until I have confirmed it by other observations of a similar kind. But though suspecting myself of some unconscious slip, I must remark that I took every possible precaution to secure accuracy, weighing 10 c.c. against 10 c.c. of distilled water in a counterpoised capsule, by means of a balance of extraordinary delicacy, and going over the matter again and again to see if I could detect any error.

A portion of this blood was treated exactly after the manner described at p. 29, and was found to yield ·6 per cent. of urea.

The kidneys were typical examples of granular degeneration, which had affected each to the same extent. The surfaces were universally uneven from small nodulations, scattered among which were a number of cysts, also small. The cortex was very much diminished, its colour reddish, presenting in this respect a very strong contrast to the colour of the cortex in the kidneys of John Coffey, where parenchymatous nephritis had been superinduced on the cirrhotic state. The pyramids were but little different from normal. The right kidney weighed 3½ and the left 4½ oz.; and not only was the capsule of each non-adherent to its surface, but, on attempting to remove the organ from the abdominal cavity, they were shelled out from their capsules, which remained adherent to the parts around.

The brain looked healthy. Its weight was 4 lb. 5 oz. This again was treated exactly like that of Baker (p. 27), and was found to yield, in 100 parts, water and matters volatile at 150° F., 74·55; solids, 25·45—or an actually greater proportion of solids than the normal brain. These results seem to me effectually to dispose of the conjecture that the uræmic state is a result of an œdematous condition of the brain.

The bronchial glands were much enlarged and very hard; indeed, the angle at the bifurcation of the trachea was filled up by a hardened mass made up of these glands; and the calibre of the right bronchus seemed to be slightly diminished. Similar large and hard glands crept up the neck, and the third cervical ganglion of the right sympathetic was imbedded in a mass of which one such gland formed the outermost portion.

Microscopically examined, many of the glomeruli and convoluted tubes were found to be much wasted, the places of the former being represented by little circular nests of connective tissue, while others were not altered. The muscular coats of the smaller vessels, as is usually the case, were much thickened.

There was a large amount of wavy tissue having exactly the appearance of fibrous tissue, especially around the glomeruli.

This case affords another striking example of the extremely insidious character of the disease. Up to twenty days before admission, or eleven weeks before his death, he had considered himself, and been considered by others, a thoroughly healthy man, and, without any inconvenience or a day's rest, had performed his duties as an able-bodied seaman. When admitted he was a strong-looking, well-nourished man. Yet the hypertrophied heart, tense pulse, and specifically light urine conclusively showed that he must have been for a very long time the subject of this serious malady.

How far the spasm of the pulmonary vessels, which seemed to be the cause of his recurring dyspnœa, and the bronchitis, were brought about or intensified by an irritation of the sympathetic from the mass which I have described, and by the large glands at the bifurcation, and how far by the poisoned blood, it is impossible to say.

Of one matter I can have no doubt: that is, the immense relief afforded to him in these spasmodic seizures by ozonic ether.

CASE 28.—ALBUMINURIA, WITH URINE OF VERY HIGH SPECIFIC GRAVITY. APOPLEXY. IMPROVEMENT UNDER TREATMENT.

On February 23rd, 1877, I was requested to see a gentleman living a few miles from Liverpool. On reaching the house I found that he had been on a visit to a distant watering-place, and that, when about to depart, just as he was in the act of ringing the bell for the waiter, in order to discharge his hotel bill, he became speechless. He did not fall or lose consciousness, but for a time seemed "wild" and confused in manner. In spite of the advice of a friend who was with him, he insisted on setting out for his home, where I saw him on the evening of the same day. He was then confused in speech, and complained of intense frontal headache. The face was flushed, the conjunctivæ suffused, and the carotids powerfully pulsating. The pulse was 85, hard and resisting, and manifestly of an abnormally high tension, but quite regular in force and rhythm. Respiration natural. The heart's action was powerful, and the heart itself manifestly hypertrophied. There was no murmur.

He was at once removed to bed, ten leeches applied to his temples, and a sinapism between the scapulæ. As the bowels were not acting freely, a pill of podophylline and compound colocynth pill was administered, and a dose of the following mixture every second hour for four doses, and then every third or fourth hour:—Tinct. aconite m. 24, liq. am. acetatis 4 oz., aq. ad 8 oz. An eighth part for a dose. Milk and farinaceous diet. The urine could not be examined then.

When I next saw him I found him greatly relieved, and he was then able to tell me that for some time he had been in the habit of rising twice and sometimes three times during the night to micturate, and that, though indulging but very moderately in alcoholic drinks of any kind, he drank very much tea and ate largely of meat, these articles of food, in one form or another, entering into the composition of every meal. I examined the urine passed during the previous night. It was abundant in quantity, nearly 30 oz.; specific gravity, 1·031, and clear when passed, but in the course of a few hours throwing down a copious deposit of pink urates; and, lastly, it contained a small quantity of albumen. He went on well, and was soon able to be up, when I examined him a little more fully. A thickness and some hesitancy of speech continued, as did also a slight but appreciable difference in the grasping power of the hands, that of the right being the weaker. He could stand with both feet together or on the left foot alone when the eyes were shut, but not on the right foot. A careful ophthalmoscopic examination failed to disclose anything abnormal. I pointed out now the necessity for a strict regulation of the diet, advising that it should mainly consist of milk, that stimulants should be abstained from, and that but moderate quantities of any kind of liquid should be taken at any one time. I examined the urine on several occasions, the last time on the 5th of April, after he had been for a long period comparatively well. It still had a specific gravity of 1·031, and contained a notable quantity of albumen. I have no record of a completer analysis then.

On the 13th of the following October I was once more hastily summoned, only to find him in a condition substantially similar to the one he was in when he came from the seaside, eight months previously, the intelligence, however, being much more obscured. For a week he lay in a semi-conscious state, answering questions mechanically, complaining for a time very much of the severe pain in his head; getting in and out of bed occasionally, but at the end of the week, when he became much improved, quite forgetting everything that had transpired in the interval. The treatment was the same as before. The urine was now more carefully examined. It was secreted in large quantities. During the night of the 13th, 23 oz. were passed; acid; specific gravity, 1·024; a small amount of albumen; urea 2 per cent. I learnt from him, a little later, that he always rose two or three times in the night still, and that he never drank anything after 8 or 9 p.m., and no alcoholic liquors at all, but ıat he had gone back pretty much to his old meat diet. On ıy pointing out the absolute necessity for changing this latter, e submitted again to one of milk and the farinacea mainly. oon the specific gravity of the urine fell, though the quantity ontinued large for some time, as will be seen from the following atement:—

Date.	Quantity.	Sp. gr.		Urea.
ov. 2 night urine	20	1·020	distinctly albuminous.	
5 ,,	22	1·018	,,	
12 ,,	36	1·024	,,	
13 ,,	36	1·024	,,	2 per cent.
16 ,,	45	1·017	,,	
19 ,,	38	1·024	,,	2.12 per cent.
21 ,,	38	1·025	,,	
22 ,,	30	1·024	,,	
23 day urine	32	1·022	,,	1.8 per cent.
23 night urine	31	1·020	,,	1.24 per cent.

He slowly but steadily improved. The headache was brought ack with great intensity on two occasions by a hot-air bath, he cautious employment of which I was reluctantly induced, fter many objections, to sanction. He was so satisfied of the ıjury done to him by the two trials of this agent as to send it f his own accord out of the house, lest he should be tempted nder any circumstances to employ it again. The effect of the ath, though it was very cautiously used, was, as I had predicted t probably would be, an elevation of bodily temperature ithout compensatory sweating and a prolonged and intense eadache. The headache lasted on each occasion between two nd three days. To the small dose of bromide of potassium, hich he had been for some time taking three times daily, I now dded five minims of tinct. digitalis, with the very best results. he amount of urine voided became gradually reduced, and for nany months past he has not had occasion to rise at all in the night. The headache passed away, and his general health became much improved.

On July the 4th, 1878, I was much struck, on paying him a visit, with an increase in the pulse tension as compared with what it had been for a long time previously. The face and brow also were redder than natural. Yet he did not feel worse than usual. I urged on him complete rest, an immediate aperient, and prescribed some liquid extract of ergot. Shortly after I left a violent epistaxis occurred, and recurred each day for four days, becoming so violent on the 8th as to excite much apprehension in the mind of the patient. The result, however, was most beneficial. The pulse became soft, the face and brow lost their unnatural flush, and the head was greatly relieved of a feeling frequently spoken of by the patient as a "fuzzy" feeling. A hypodermic injection of two grains of ergotine at once checked the epistaxis on the fourth day, when I thought it had continued long enough.

At the last examination the urine was still distinctly though slightly albuminous. It was clear, acid, specific gravity 1·021, and but for the albumen would have been considered quite normal.

The cardiac hypertrophy without valvular disease, the pulse of high tension, the long-continued secretion of large quantities of urine, and the constancy with which albumen in small amount has been present for seventeen months, leave no room for doubt as to the nature of the case.

There are several points worth noticing. Firstly, the compatibility of the existence of granular kidney with urine of a very high density. This gentleman when I first saw him was passing a large quantity daily, having a specific gravity of 1·031, and depositing when cold a copious precipitate of urates. I have heard this deposition of urates (even in urine that has been scanty) cited as evidence against the existence of organic renal disease. Yet this case is a proof of the unsoundness of such an opinion when quite unqualified. The single feature which has never once been missed is the albumen. For a long time the urine was secreted in unusual quantity; but by degrees the amount fell till it at length became normal. Albumen has never once been absent even from the portion secreted during the night. The specific gravity must always be considered side by side with the patient's habits. If, as was here the case, very large quantities of meat are eaten, the amount of urea and urates and the specific gravity *must* be high if urine is secreted at all. The undeviating presence of albumen is therefore the earliest and best sign which the urine can afford of the disease in its more remediable stage. Of course, when the degeneration has extensively involved the tissue of both kidneys, the density of the urine will fall to a very low point; but then a time has been reached when cure is impossible, and even amelioration sometimes difficult. It is always judicious to examine the urine in the case of non-febrile, well-fed people, who complain of frequent headache; and if albumen is found, again to examine for several successive days or weeks, taking care to exclude any chance of error from the admixture of prostatic or other albuminous fluid.

Here I would give a word of caution as to the *mode* of making the examination. It should always be remembered that the proportion of albumen is in the great majority of these cases small: the ordinary tests will therefore sometimes mislead.

On this point I would direct attention to the remarks made on pp. 171–2.

The great advantage of a milk and farinaceous diet, and, I cannot help thinking, the equal advantage of the administration of digitalis, were shown here. How it comes to pass that, in a disease where high arterial tension and cardiac hypertrophy are present, a drug which in health makes the ventricular contraction more powerful and increases the tension should be useful, I will not pretend to say, although speculation on the subject would be very easy; but of the fact of its utility there is strong evidence. Under the employment of these means the headache abated, the urine fell to a normal amount, the pulse became soft and natural, the albumen reduced almost to a trace, and the general health improved in a very remarkable manner.

Although it is generally maintained that the disease advances equally in the two kidneys, I think it is by no means improbable that contraction was more advanced in one kidney than in the other in the above case when the nature of the disease was first recognized, and that a complete change of habit and the removal of the intense stimulation of a highly nitrogenised diet might be followed by a cessation of the diseased process.

That the disease may progress unequally in the two organs is manifest from the case of J. Oswald, pp. 126–8.

I think, too, that this case shows the necessity of caution in the use of the hot-air bath. Two slight apoplectic seizures had already been experienced; headache, even when the patient was well, was easily induced by heat or excitement, and had been a very pronounced symptom during his illness; there was no trace of œdema; yet a strong desire being expressed to try this agent, on the general idea that in renal diseases the skin should be stimulated, I was unwillingly prevailed on, after pointing out the risk, to permit its tentative employment. I have again and again had the bodily temperature taken during the use of the bath, and have not unfrequently found that it has risen to 102° and 103° F. before perspiration has commenced; and though this preliminary rise is generally not of any great consequence in the young or middle-aged (though even in their case I have not unfrequently had to withdraw the bath in consequence of the discomfort thus induced), yet in those more advanced in life, and especially in those where serious head symptoms have already occurred, it becomes attended with risk.

This case also shows, in a very striking manner, the extremely insidious character of the disease. Up to the date of the first cerebral attack the gentleman had regarded himself, and was regarded by everybody who knew him, as in the enjoyment of robust health. He was rather stout, but abundantly active, of a ruddy complexion, and very regular habits of life. Yet there can be no doubt that he had for some time been the subject of renal atrophy in its earlier stage; and after his first illness facts were elicited, in the light of which, had they been known, the presence of the disease might have been diagnosed. Thus, there had been the large secretion of urine, necessitating micturition twice or thrice every night for a considerable period; and from the constancy with which albumen has been present since he first came under observation, there is no doubt that it would have been detected before if circumstances had led to an examination.

Another matter, which may be alluded to in connection with this case, is the advisability of limiting the quantity of liquid drunk at any one time. This gentleman was in the habit of drinking several large cups of tea, one after the other in rapid succession, several times a day. This somewhat sudden introduction of a large amount of liquid into the circulation could hardly fail temporarily to raise the already too high blood pressure. The advisability of maintaining the vascular tension as equable as possible is obvious, and it is much better for the patient to take many small drinks at shorter intervals than several very large ones less frequently. So far as I have observed, this practice of drinking inordinately is a very common if not an invariable one among the subjects of contracted kidney; and it is not impossible that, in connection with other less obvious causes, it may help to establish the disease. The beverage taken is not always so harmless as tea; but whatever it be, whether tea, water, milk, beer, wine, or other drinks, it is often at least taken to excess, and taken especially too largely at one time. I always advise a more equable distribution throughout the day of liquid drunk, even when I do not considerably control the total quantity; and I think this point, for the reasons which I have given, is deserving of general attention.

Failure of sight, more or less complete, is a very common incident, generally discovered suddenly by the patient, sometimes obviously associated with albuminuric retinitis, at others without any striking change recognizable by aid of the ophthalmoscope. Sometimes, also, the amount of albumen is considerable.

CASE 29.

Thus, on January 14th, 1877, I saw, with Dr. A. Williams, a young man, A. S., aged 33. He was of a robust and powerful build. The eyes were suffused, the face flushed, and the head constantly aching. The pain in the head was heavy and dull, commencing posteriorly, and extending to the forehead. At times, however, it had been acute. He was complaining of constant vomiting Tongue white in centre, red and moist at edges; bowels generally confined; lungs normal; heart's impulse heaving and powerful, sounds normal; decided but not very extensive hypertrophy, affecting mainly the left ventricle; pulse hard, resisting, regular, 140. A few days previously he had suddenly found his sight, which had always been very good, become so defective that he could not see to read ordinary print. The urine was very abundant, pale, quite clear, specific gravity 1·010, and extensively albuminous, the albumen occupying from $\frac{1}{4}$ to $\frac{1}{3}$ of the portion of the test-tube containing urine. For nearly two years he had been obliged to rise once or more during the night to pass water. There was no œdema.

The patient's family history was good. He himself had been the subject of syphilis fourteen years previously, and for several years past had drunk six pints of beer daily, as well as spirits at night.

We directed sinapisms to be applied to the nape of the neck, an absolutely milk diet, bromide of potassium in acetate of ammonia mixture, the occasional use of compound jalap powder as an aperient, and later on iodide of potassium in increasing doses.

In this case, which I only saw on the one occasion, from not knowing beforehand its nature, and, therefore, being unprovided at the time with an ophthalmoscope, I was unable to make an examination. In others, however, the results of examination have been strikingly various.

Case 30.

Thus, on August 13th, 1871, I saw, with Mr. James Hendry, on the evening before leaving for my autumn holidays, a young man, who, while suffering apparently from such a combination as was presented by the case of C. Carr, suddenly became totally blind, and yet the ophthalmoscope revealed no marked change, or at least none distinctive of retinitis. The urine was very albuminous, and the feet and legs œdematous. We afterwards learned that the patient removed to Yorkshire, where he died, without having recovered his sight.

Generally speaking, however, there are obvious changes in the retina and disk, easily recognizable by means of the ophthalmoscope, and these changes are more frequently associated with the cirrhotic than other forms of chronic kidney disease. But they are not, as some would seem to suppose, alone associated with the former affection, but will, in not a few cases, be formed during the progress of chronic parenchymatous nephritis. A conspicuous example of this is that of a man named Cornelius Carr, in whom the renal disease had existed certainly for more than a year, in whom also the retinal changes were very marked, but whose kidneys were typical examples of the chronic parenchymatous disease.

If the nutrition of the retina has not been too seriously interfered with, much benefit may, I believe, be hoped for from the instillation, or the hypodermic injection beneath the skin of the temple, of the solution of sulphate of strychnia, in gradually increasing doses. And even where advanced organic changes have taken place, this practice will often be attended by a certain measure of relief, though, of course, more than relief cannot then be hoped for. Thus I have now under treatment in hospital a patient named Richard Wall, aged 36, a strong, well-nourished seaman, in whose retinæ there are numerous white lines and patches, the former running side by side with the vessels, and in whom the disk is obscure and ill-defined, and the vessels at some parts very much thinned; reduced, indeed, in some cases, to fine thread-like lines—on whom such an instillation four times daily is being practised with great advantage, the improvement in sight being very marked.

Before leaving this subject I will briefly sketch another case, as in its course several interesting symptoms manifested themselves:—

CASE 31.

The subject of it, Charles McIntosh, was, like John Conway, a coloured sailor. He was 31 years of age, and, with the exception of ague, from which he once suffered in Panama nine years previously, had always been well. He was admitted on January 24th, 1877, for a cough, which had commenced three months previously, on his getting wet through during a voyage from the East Indies. Up to that time he had been quite well and working without difficulty as an able-bodied seaman. He was a strongly-made man, apparently not at all reduced by his cough. His principal complaint was of dyspnœa, which was aggravated every night, yet there was no dulness anywhere over the chest, and but slight moist râles. Respiration, 42; pulse, 90, resisting; heart much enlarged, the hypertrophy involving mainly the left ventricle; no valvular murmur, but a strongly accentuated second sound, which the notes of his case also describe as being "loudly heard all over both chests;" carotids strongly pulsating; no stridor. Urine abundant, 40 oz. during the night; pale; free from deposit; acid; specific gravity 1·010; a trace of albumen; chlorides abundant. Tongue moist and furred; bowels regular.

Under a carefully regulated diet and diaphoretic medicine his symptoms became much improved, so that on February 13th he was allowed to get up and move about the ward. The dyspnœa in his case had been greatly relieved and good nights' rest procured by a draught containing 40 minims of a tinct. lactucarii. On the night of the 16th, while in bed, he was suddenly seized with severe pain in the lower part of the left chest, followed by a pleuritic rub, which was audible up to the 19th, after which date he experienced no further inconvenience from the thoracic pain. On the 27th he was attacked by rheumatic inflammation of most of the large joints, with a quickened pulse, and some amount of fever. He was treated with salicylic acid, and this attack in its turn passed away, leaving him as before. Occasionally he had morning vomiting, and at uncertain intervals would wake suddenly with a start during the night, with the sensation of being tightly grasped across the chest, this being followed by orthopnæa. These attacks were not very frequent, and he could not tell on what night they were likely to occur.

Thus he went on till the 11th of April, at 2 o'clock in the morning of which day he was seized with a "fit." I saw him twelve hours later, and learnt from the house-surgeon that he was in substantially the same condition as when he had been called to him during the night. He was lying on his back; the head was elevated, and occasionally he moved it to one or the other side, but without any regular periodicity. If either eyelid was raised, he at once moved the head towards the opposite side. The pupils contracted slowly but not completely to light, and were equal in size. The lids were being repeatedly slowly raised and depressed by himself, but when the left one was two-thirds closed, the right was always quite closed, nor was this last ever widely opened as the left. The eyeballs oscillated slowly from side to side with some regularity, but with occasional intervals of rest. I did not remark whether the cessation of the nystagmus had any relation to the periodical suspension of respiration. This latter was extremely regular. It lasted from ten to twelve seconds, during which period there was no movement of the chest whatever. Then there were eight quick respirations, completed in about the same interval of time, and always commenced by a slight moan, a similar moan generally also ushering in the pause. The pulse was always slightly accelerated during the pause, being then ten in five seconds, and during respiration eight in five seconds. The mouth was kept closed, and during the period of respiration air was forcibly inhaled and expelled through the nostrils. The conjunctiva was sensitive, and the lower limbs were slowly moved away when pinched. Motions and urine were passed involuntarily. The above conditions continued throughout the day. On the 12th the Cheyne-Stokes' respiration gradually gave place to normal breathing, and on the afternoon of that day he seemed slowly to wake to an automatic kind of life, sitting up in bed mechanically, once getting out and standing on the floor, staring vacantly before him, giving no sign of recognition when addressed, but swallowing a little milk when it was put to his lips. On the 13th he said, "Give me some milk," but did not appear to recognize the ward-sister who gave it to him. He gradually became completely conscious; but on the 15th was quite unaware of anything that had happened during the preceding four or five days, and complained of nothing but slight pains in the head and enormous hunger. This hunger lasted for a long time. On the 6th of May he had a smart attack of epistaxis. On the 21st of the same month the great pressure of acute cases on our space compelled me to have him sent to the Workhouse Infirmary, and I lost sight of him.

SOME POINTS CONNECTED WITH THE DIAGNOSIS OF GRANULAR KIDNEY.

Everyone will probably admit the great importance of the early detection of the disease. When it has passed into the stage characterised by an abundant flow of urine of very low specific gravity and by great cardiac hypertrophy, the most that can generally be done is to so regulate the habits of life as to ward off the terrible results, such as apoplexy and the various manifestations of uræmia, which it naturally tends to produce. Yet these are among the more important characters by which we are usually taught to recognize it. The points on which I desire to insist are—firstly, that the existence of the disease in a recognizable stage is not inconsistent with the secretion of urine of high specific gravity; secondly, that one of the earliest, if not the earliest, signs that can really be relied on, is the existence of small quantities of albumen in the urine; thirdly, that, for reasons which I will give, this albumen is very liable to be overlooked; and, fourthly, that anæmia is by no means always present as it is in other chronic kidney diseases.

I do not say that there are not often other signs, which careful observation may recognize as probable evidence of the existence of the disease in an early stage; but they are not such as would make its existence a matter of certainty in the absence of the albumen. Thus, I believe that the subject of the disease very soon comes to recognize that he cannot take so much stimulant as he once could without marked discomfort. But such altered capability may arise from many other causes. Unusual disturbances of various kinds during sleep, such as those arising from dyspnœa, &c., I believe also to occur very early, as likewise, no doubt, does an increased frequency of micturition; and if all of these, and some other signs—such, for example, as frequent headache—concur, they will afford ground for very strong suspicion that it exists, even if the specific gravity of the urine is high. But even all of these together, much less any one by itself, cannot be held to prove it. If, however, we add to them, or if we have in their absence, urine that is *constantly* slightly albuminous, then I believe that we may be certain of it. I will not stop to inquire whether albumen does not necessarily imply high arterial tension, which in its turn must imply more or less cardiac hypertrophy, and whether, therefore, cardiac hypertrophy should not be taken as an earlier sign still, because I know cases where albumen has existed for months, and where yet cardiac hypertrophy has been so slight as not to attract the attention of very experienced observers who have examined the patients.

The specific gravity may be high. I have already mentioned the case of a gentleman whose urine, when I first examined him, nearly two years ago, had a specific gravity of 1·031, and yet was distinctly albuminous, and has continued so ever since; and I have had another gentleman also under observation for nearly the same time, who has never had a urine of a less specific gravity than 1·020, and more generally it has been 1·025, while I never once examined it without finding albumen. Indeed, I believe that this substance is certain to be present in the earlier stages, even though it may be occasionally absent later on, when the heart begins to grow fatty, if it should do so, or when the patient is obliged to remain absolutely at rest.

It becomes, therefore, a matter of extreme importance to recognize it. Yet I need not say I believe, because I have several times had absolute proof, that it may not be recognized. Where I have seen it overlooked has been under the following circumstances. The urine when heated had become opalescent owing to the separation of earthy phosphates. A few drops of nitric acid have, however, instantly dissolved these, and produced a perfectly transparent solution; and, on the strength of this, it has not unnaturally been concluded that no albumen was present. But if this same urine, instead of being put hastily aside, be watched for five or six minutes, or until it has become nearly cold, a turbidity will again appear, commencing usually at the bottom, and spreading thence throughout, which turbidity neither heat nor more nitric acid will dissipate. And if the test-tube be put aside for an hour or two an unmistakable deposit of albumen will take place.*

But I am sure that such a separation of earthy phosphates in the earlier stages of this disease is not uncommon, even though the reaction of the urine after having been heated remains distinctly acid. Why it is that, when they are thus diffused through the urine by boiling it, albumen is very slow to make its appearance in a coagulated form on the addition of nitric acid, I cannot say; but I am sure that such is the case, and that it sometimes leads to mistakes.

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* Dr. Lionel Beale thinks that a trace of nitric acid will prevent the coagulation of albumen by heat, by decomposing the phosphates and setting free the phosphoric acid in which the albumen is soluble. (Beale *On Kidney Diseases and Urinary Deposits*, 3rd ed., p. 225.) In the cases to which I refer, much more than a trace of the acid is used, and the precipitation is not prevented, but delayed.

It may, possibly, have some relation to another fact, which I merely mention here because it *is* a fact, and because I have never seen it either mentioned or explained elsewhere—viz., the impossibility of separating, by any amount of filtration, the phosphates precipitated by the baryta solution in the preliminary steps of Liebig's process for estimating urea, if albumen be present. I have many times, some years ago, before Liebig's process was supplanted by a better one, filtered through paper after paper of the very best kind that I could procure, either in this town or elsewhere, only to find that the urine was as opalescent after running through the last as it was before I put it into the first, and I had, at length, to come to the conclusion that it was impossible to separate the phosphates without first getting rid of the albumen.

But to avoid the delay which the process ordinarily followed entails under the circumstances alluded to, and to attain an accuracy which is not so attainable by it, I now always employ the method recommended by Haller, and quoted in pp. 68 and 69 of Nenbauer and Vogel's work on the urine (Syd. Soc.'s Translation, 4th ed.). This is effected by pouring one to two drachms of nitric acid into a cone-shaped urine glass, and then allowing the urine, filtered if necessary, to trickle down the side of the glass so as to float on the acid. If albumen is present, a gradually deepening opalescent layer will appear immediately above the acid, undissolved by warming the side of the glass, and quite incapable of being confounded with anything else. The cases alluded to above gave instantly evidence of the presence of albumen when this method of applying the test was employed; and as it is not always convenient to wait 8 or 10 minutes over a case of urine examination, it is always safer to employ the test in the manner just indicated. It is as well also to employ a filtering paper, whether there be turbidity or not, for by inclining the paper so that its point shall rest against the side of the glass, instead of the centre, and then by gently inclining the glass itself, the urine flows so gently down as not to disturb the surface of the nitric acid, an effect which it is difficult to avoid, even by the careful pouring from a pipette.

Lastly, I must enter my emphatic dissent from the opinion, which I believe to be almost universally entertained, that the subjects of uncomplicated advanced renal cirrhosis are, like the subjects of some other chronic kidney diseases, necessarily anæmic. This certainly need not be the case, and if the presence of anæmia or wasting is relied on as an element in diagnosis, it will often cause error. I have now two patients who have been under observation for nearly two years. They are both undoubtedly the subjects of this affection, yet a stranger, judging simply from their appearances, would consider them robust and healthy men. If the disease is uncomplicated—if, for example, it be not caused by lead impregnation, with the general cachexia induced by lead, or succeeded or accompanied by parenchymatous nephritis, or some other disease which does cause anæmia—it often does not entail the least loss of colour or flesh in those who are the subjects of it. In confirmation of this statement, it is only necessary to refer to the account given by Bartels of some of his most typical cases. (1) A musician, who, up to the date of his almost sudden death from erysipelas, was thought quite well by himself, his family, and his friends. "Kidneys contracted in an extreme degree." (2) A merchant, always robust, with tendency to obesity. Unwell during one summer, but never consulted a medical man till the following December, when very advanced disease was discovered. (3) A large, stoutly-built, muscular man, in capital nutrition. Seized suddenly with general convulsions. Was bled twice. Death. P.-m.: "Both kidneys were notably diminished in size," &c. (4) A robustly-built master carpenter, suddenly struck down while engaged in building a house. Death speedy. Kidneys much contracted. (5) A girl, 18; general state of nutrition good; skin quite pale. P.-m.: "Atrophied kidneys. Ulceration and stricture of lower end of ilium." (6) A gentleman, who, apart from thirst and blindness, caused by the retinitis of *advanced renal atrophy*, was feeling *perfectly strong and well.* (7) A man, strong, well nourished, and of fresh complexion. Advanced disease. The same patient, in the autumn of the same year, after an attack of apoplexy, which left him hemiplegic and aphasic, and, *after successive large hæmorrhages from the bowel*, anæmic.

Thus only one of these (case 5) was emaciated and anæmic when the disease was diagnosed; and in her case there was ulceration of the intestine as well as the kidney disease. In the frequent absence both of emaciation and anæmia, this affection stands in marked contrast to the amyloid degeneration, and chronic parenchymatous nephritis.

My own observations are exactly corroborative of those of Bartels. Even if there were legitimate ground for doubt concerning the condition of the kidneys in William McLeod, William Wall, Mrs. F., the two gentlemen alluded to above, &c., on the ground that the organs have never actually been seen, there can be none concerning those of Henry Baldwin, John Conway, and others, in whom the nutrition of the tissues generally was well maintained, and a strikingly healthy colour kept up to the last, where the natural hue of the skin rendered it possible for the existence of such a colour to be recognized, though the disease was of a most advanced character. But there is no legitimate reason for doubt concerning any of the cases, as, with care, it is impossible to mistake a case of cirrhosed kidney; and, taken altogether, they (and others might be added to them) establish the proposition that there is no necessary connection between that disease and the existence of anæmia and emaciation. And if these, or either of them, be depended on as an element in diagnosis, error will often be committed.

CHAPTER VI.

REMARKS ON SOME CURRENT VIEWS ON THE PATHOLOGY AND ETIOLOGY OF CIRRHOSIS OF THE KIDNEYS.

It was no part of my design to enter into the various theories of this disease which have been propounded. Yet allusion to these cannot altogether be omitted. It has appeared to me, as I have watched with much interest the progress of the discussion that has been going on of late years on this subject, that sufficient care has not been taken by the disputants to distinguish between fact and inference, or even to decide on what is the true interpretation of certain appearances which all alike observe. Let us, in the first place, see what is on every hand agreed upon as fact. There is no dispute then, I think, that the kidneys become smaller; that the diminution affects principally their cortical structure; that the surface becomes rough and uneven; that the capsule is usually thickened and adherent in places; that there are often a number, sometimes a great number, of small cysts in the kidney, and especially on its surface; that the small branches of the renal artery are remarkably thickened; that many of the glomeruli are very much smaller than natural; that in most cases the heart, and especially the left ventricle, is hypertrophied; that the radial pulse is commonly one of high tension; and that death from apoplexy or pericarditis is very common.

These are facts that I believe no one will question. Outside of these, however, everything is the subject of dispute. Thus, on the simple question of density of structure, which would, at first sight, seem to be one admitting of no possible difference of opinion, we have the following conflicting statements:—"Even by the naked eye and by touch we recognize an increased density and fibrousness of structure." (Grainger Stewart, pp. 107–8.) "These small kidneys are remarkably tough." (Bartels, in Ziemssen's *Cyclopædia*, vol. xv., p. 451.) "The tissue of the organ is never tough, as in cirrhosis of the liver." (Wilks and Moxon, *Path. Anat.*, p. 510.)

If now we turn to the appearances observed under the microscope, and the interpretation to be put upon them, we meet with similar, if not greater, differences of opinion. When a thin section is viewed under a tolerably high power, there is certainly *an appearance* of greatly increased fibrillation. Around the vessels, among the tubules, and encircling the glomeruli, are a great many wavy lines, with what look like elongated nuclei, presenting so much the aspect of connective tissue that it is very hard to persuade oneself that it can be anything else. Yet, remarkably able men *are* persuaded that it is something else, and have given remarkably able reasons for thinking so. Thus Drs. Wilks and Moxon remark: "Some authors, especially Dr. Dickenson, describe an increase of fibrous tissue: we think there is a little increase around the vessels, but not much. The patches, apparently of fibrous tissue, figured in Dr. Dickenson's excellent drawings, we have always seen; but high powers resolve these patches into the remains of tubes." (Op. cit., p. 509). On the very same subject Dr. Grainger Stewart writes thus: "Under a higher power (300 to 400 diameters) the increase of the fibrous tissue, and the atrophy of the tubular elements, are very distinct. The malpighian bodies are seen to be surrounded by dense fibrous tissue, their capsules greatly thickened, and the tubules compressed and atrophied by the increase of intertubular substance." (Op. cit., pp. 108-9.) It has always seemed to me to be very difficult to interpret the last appearance described by Dr. Stewart in any other way than he and many others have interpreted it. Many of the glomeruli are undoubtedly completely invested by what looks like a very thick capsule made up of wavy lines many layers thick. If the other apparent fibrillation admitted of the explanation put upon it by Drs. Wilks and Moxon, this would scarcely do so, for there seems no reason why the wasted tubules should, layer upon layer, completely encincture the glomeruli in the way that they are encinctured.

If we consider the etiology of the disease, we are met by such opinions as the following:—

"Granular kidney is a disease of a sub-inflammatory nature" (Clifford Allbutt, in *Med. Chi. Rev.*, Oct. 1877, p. 281), with which agrees the name of interstitial nephritis given by Rindfleisch, Dickenson, and others.

"It may be asserted that . . . the connective tissue nevertheless results from an inflammatory process, but I know no evidence in favour of such a view, and the theory of a simple hypertrophy of connective tissue best explains the pathological and clinical phenomena." (Grainger Stewart, op. cit., p. 112.)

"It certainly admits of dispute, however, whether the increase of interstitial connective tissue—a process brought about in so many organs of the human body by persistent venous congestion, and by which the implicated organs become so remarkably tough—should be regarded as inflammatory or not." (Bartels, in Ziemssen's *Cyclopædia*, vol. xv. p. 203.)

Dr. George Johnson, on the other hand, and more recently Professor Charcot, while considering the disease to be inflammatory, believe that it primarily affects the epithelial cell, the implication of the connective tissue being, in their opinion, only secondary. Hence the name "chronic desquamative nephritis" of the former author,* and "epithelial cirrhosis" of the latter †—Professor Charcot explaining the occurrence of granulation on the ingenious assumption (for I am not aware that it has yet passed beyond the stage of assumption) that the red depressed portions are structurally continuous with the cortex proper, which is alone affected in this disease, while the granulations, although topographically in the cortex, are structurally allied with the medulla, being merely in the line of bundles of collecting tubules on their way from the surface inwards.

It is thought by some that prolonged congestion of the kidneys, resulting from cardiac disease, is competent to produce an increase of the fibrous portion of the gland structure and ultimately cirrhosis. That the general effect of chronic congestion is to cause induration of the parts congested seems to have been pretty well established by Sir William Jenner and other physicians; and there is no doubt that the kidneys of patients who have been the subjects of prolonged cardiac affections, resulting in dropsy, are generally markedly different from those of the healthy. But the change induced is very unlike that caused by granular degeneration. The organ is often somewhat smaller than natural, it is true, but never so much smaller as the cirrhosed kidney. It is, moreover, round and plump and tense. The capsule seems stretched to tightness. The cortex is in normal proportion, and its colour is red—almost invariably a deeper red than that of health—with the glomeruli easily recognizable by the naked eye as a number of minute points of a still deeper redness than that of the general groundwork. Occasionally there is some degree of adhesion of the capsule, and at times a very slight irregularity of the surface, but neither of these, I think, ever amounts to anything like what is seen in genuine atrophy of the kidney. The specific gravity is diminished. The characteristics of the urine also are quite distinct from those of the urine in granular degeneration.

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* *Diseases of the Kidneys*, p. 168.

Le Progrès Medical, Dec. 22, 1877, and Feb. 2, 1878; and *London Medical Record*, March, 1878.

But although the congestion of heart disease may not cause genuine atrophy of the kidney, the two diseases can exist together, as there is no absolute incompatibility between them. If, however, the second affection were a natural *consequence* of the first, we should expect to find the cirrhosed state very common in advanced cardiac disease; yet, I think, everyone will admit that their concurrence is not common.

If we inquire what are the remoter causes of the disease, we are met by a still greater diversity of opinion.

Thus, on the question of its relation to gout, one authority writes:—"It appears to me an undoubted fact that gout—hence presumably the contamination of the blood with uric acid, or rather with the salts of this acid—may give occasion to genuine contraction of the kidney." (Bartels, in Ziemssen's *Cyclopædia*, vol. xv. p. 414.) In the same strain wrote Rayer, Todd, Garrod, and others. Yet we are informed that "confidently as this belief is held, it is assuredly false"

(Clifford Allbutt, in *Med. Chi. Rev.* for Oct. 1877, p. 294)—the same author, in another place, speaking, however, of gout as "one of the first *consequences* of dwindling of the kidney." (*Brit. Med. Jour.*, Feb. 10, 1877, p. 158.)

As to the relation of the disease with lead impregnation, Ollivier, in Nos. 10 and 27 of the *Gazette Hebdomadaire* for 1863, seemed to have succeeded in establishing a relation between lead poisoning and a form of kidney disease attended with albuminuria; while Grainger Stewart, in "several cases in which Bright's disease co-existed with lead poisoning . . . . found this form of renal disease," *i.e.*, cirrhosis, "was the one from which they suffered." (Op. cit., p. 137.) Dickenson also and others believe in their interdependence; while, on the other hand, Rosenstein completely denies it.

As to drunkenness as a cause, we meet with such opinions as the following:—"Drunkenness is, in my experience, a very common characteristic of the victims of this form of renal disease, and . . . . I am satisfied that a connection really exists between cirrhosis of the kidneys and intemperate habits." (Grainger Stewart, p. 138.) "In my own experience I very rarely find a case in which alcohol seems to have caused the disease." (Clifford Allbutt, in *Med. Chi. Rev.*, Oct. 1877, p. 294.) "Above all I must enter my protest against the view, which is widespread in England, although Dickenson certainly disputes its correctness, that the abuse of spirituous liquors favours the development of the genuine contracting kidney." (Bartels, in Ziemssen's *Cyclopædia*, vol. xv. p. 412.) And so on, similarly divergent opinions being expressed on every point. The latest suggestion as to what he considers as probably the chief cause of this disease, is one by Dr. Clifford Allbutt, in a paper read before the British Medical Association, at its meeting at Sheffield, in 1876. He places it in "carking care or bitter and long sorrow." No attempt is made to explain *how* the connection is brought about. The co-existence of the two was found in a certain number of observed cases, and in the opinion of the author, the impossibility of the operation of other causes was sufficiently established to warrant him in concluding that they were related as cause and effect; and so convinced is he of this genetic relationship that he mentions the case of a maiden lady as of one who had "worn her kidneys granular by years of fretting over the trials and interests of others," just in the same way as one would speak of a seamstress as having worn her fingers to the bone by years of hard working with the needle for others.

Without denying the possibility of such a relationship, I will merely venture to suggest that twenty-four cases—the number in which the supposed relationship was recognized—are too few to serve as the basis for such a theory; and the exceptions (eleven) too numerous not to excite a suspicion that there must be some yet undiscovered cause or causes capable of explaining them all. The induction is not wide enough, the process of exclusion not rigid enough to make it safe to accept the conclusion. The most philosophical position seems to me to be the one taken by Bartels, who says: "In the great majority of my cases I have been obliged to renounce the attempt to fix upon any circumstances which might be assigned as the cause or origin of the disease." (Op. cit., p. 415.) Yet it is very curious, in the face of such utterances, and of the knowledge which most medical men must have of the endless differences of opinion that exist on almost every one of the points connected with the disease which can possibly be open to such difference, to be told by a recent quarterly reviewer that "within one generation, keen, patient observers, ardent in their great calling, have tracked out *the causation*, *the pathology*, *the clinics*, and, let us add, the *therapeutics of it*." (*Med. Chi. Rev.*, Oct. 1877.)

CHAPTER VII.

ON THE TREATMENT OF CHRONIC KIDNEY DISEASE IN WHICH THERE IS LITTLE OR NO DROPSY (CIRRHOSIS).

A NOT unnatural result, perhaps, of the knowledge of structural change which modern pathological research has shown to take place in certain diseases, has been the generation of a feeling of despair on the subject of treatment. Many pages are devoted to minute details concerning histological changes, much ingenuity is manifested in the discussion of theories of causation, while a few brief sentences often comprise all that it is thought necessary to say concerning treatment. In no disease is this vice of modern medicine more conspicuous than in the one now under review. Yet it is tolerably certain that of two patients with granular kidneys of about the same degree of advancement, one may not unfrequently go on living in comparative comfort years after the other has died, and that that which has determined the difference in the two cases has been treatment, using this term in its widest sense. If this is true, as I am certain it is, treatment is as much a matter of moment as, and to the patient far more so than, discussions, however ingenious and in themselves interesting, on pathology and physiology. By treatment of course is not meant the mere administration of drugs, but the entire regulation of the life so as to counteract the conditions which tend to develop or aggravate the disease. The sooner that this latter can be detected the more hopeful obviously will be the efforts at counteraction.

I have given reasons elsewhere for considering the constant occurrence of a small amount of albumen in the urine one of the earliest and most reliable signs.

What is the line of treatment to be adopted so as to secure the best results? Firstly and chiefly, diet, regimen, exercise, indeed the whole manner and habit of life must be so ordered as to oppose the conditions which commonly accompany the disease, and therefore presumably favour its development or continuance. It is absolutely necessary that the patient be taken fully into his adviser's confidence. He must be made to appreciate the reasons for the course of treatment to be adopted, and his cordial co-operation be obtained, or very little can be done. The entire mode of life must be carefully considered, and any habits whose tendency is known to be in the direction of the disease must be dropped at once, and their effects steadily opposed by others that have an opposite tendency.

As a general rule, to which the exceptions must be very few, a total abstinence from alcoholic drinks should be encouraged.

A large proportion at least of alcohol that is drunk is speedily eliminated under ordinary circumstances, unchanged by the kidneys, and when these are deranged it is presumed to be retained in the system longer than it otherwise would be, exercising during its retention injurious effects on the tissues.* I think it is fairly open to doubt whether it and other substances ordinarily discharged with the urine *are* retained thus long within the system. But I do not think it equally open to doubt that there is often a marked change in the capability of the subject of this disease to take wine or spirit, compared with the capability which he possessed while yet he was healthy; and as still less open to doubt that the alcohol will do him more harm than good whether he experiences such a difference or not. Frequently, however, the patient is sufficiently alive to the change. He knows that his head is affected by far less than he could formerly drink without any inconvenience; and if he is wise he will take the hint thus afforded him and abstain altogether.

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* On the power of elimination possessed by the kidney in disease, *vide* Nos. of *Le Progrès Médical* for June, 1877, and note B.

The diet should be of the simplest and most easily digested character. It should contain but a moderate amount of nitrogen, and leave but little innutritious residue. The reasons are obvious. No substance fulfils these indications so well as milk; and there is no doubt that if the patient can be induced gradually to adopt a diet of which this fluid forms the main ingredient, his life may be prolonged and his comfort maintained for many years. It is not at all unusual to see the distressing and continued headache, which so constantly occurs in the advanced stages of this affection, disappear entirely immediately on the milk diet being adopted. I have given an instance of this on page 143. But while urging the employment of a milk diet, there is one caution that it has always seemed to me necessary to give, and that is that no very large quantity of fluid shall be taken at any one time. This has appeared to me necessary for several reasons. Firstly, it is injudicious to distend the stomach, even temporarily. But more important than the necessity for not distending the stomach is it that there should be no increase in the tension of the blood-vessels. This is always high. There is great lateral pressure on the walls of the arteries, some of which, and especially those of the brain, are often the subject of degeneration. If through the rapid absorption of a considerable quantity of fluid this tension is temporarily increased, there is additional danger of a result to which there is always a peculiar liability, viz., cerebral apoplexy. Arterial tension then should be kept as equable as possible, which will not be done by alternately over-filling and partly emptying the vessels by the rapid absorption and slow elimination of large quantities of fluid.

It is exceedingly common for apoplexy to occur immediately after meals, or after drinking largely; and it is not impossible that the quantity of the drink has as much to do with the result as the quality.

I have no direct evidence as to the influence of tea in either promoting or retarding this disease. Where my patients are in the habit of drinking it I do not recommend its entire discontinuance, simply requesting that it, like all other liquids, be not taken in large quantities at any one time. I am quite sure, from two careful series of examinations of my own urine in two different years, for equal periods of time, during half of which tea was drunk, and the other half an equal quantity of milk and water, that tea either retards the formation or prevents the elimination of urea, the same amount of this substance being excreted in six days while milk and water, as in seven while tea, was being drunk. But I feel equally sure that the administration of tea or coffee will not prevent the development of uræmic symptoms when they are threatening.

Next to diet in importance comes the regulation of the functions of the skin. Flannel should be worn winter and spring, and some lighter material of the same texture even in the warmest seasons of the year. The atmosphere also should be kept moderately warm, but the greatest care should at the same time be taken to prevent its being close and surcharged with carbonic acid gas. The sitting-room should therefore be large and airy, and the bedroom also large, and in winter well warmed. Passive exercise is at all times useful, and if there is not excessive hypertrophy of heart, walking, short of fatigue, on level ground may also be of advantage; but the effort to mount even a moderate elevation may be attended with discomfort, and is not always free from danger. In recommending change of scene, the nature of the surface should always be carefully considered.

The utmost freedom should be allowed to the circulation; all tight stocks, collars, waist-belts, garters, boots, or even hats, being studiously avoided. As the disease gains ground the heart is sure to have more work to do than it can healthfully accomplish without becoming hypertrophied, and the least additional obstruction which fashion or habit imposes only acts in the direction of the disease, while the removal of all such obstructions directly opposes its natural tendency. Trivial, therefore, as an inquiry into the kind of boots that are worn may seem to some, there is nothing trivial about it. As the close-fitting boots with elastic sides grip the feet and interfere somewhat with the circulation, they should be discarded for easy fitting laced ones. It is not at all uncommon, when œdema is found at all, to see quite a ridge immediately above the upper edge of the elastic, and to see the foot remain quite pale, small, and bloodless for the first few minutes after the removal of the boot, and then acquire the same colour and fulness as the parts above as the circulation through it becomes quite free, showing that the boot, while being worn, interfered with the flow of blood.

Warm socks and long drawers are similarly far better than stockings that require ever so loosely to be gartered.

Simple diet, pure, moderately warm air, a warm, well-acting skin, and absolute freedom from constriction anywhere on the surface of the body, are among the chief non-medicinal means for combating the disease.

Medicinal treatment must, among other things, be directed to the removal of constipation. If, in consequence of the deficient exercise and milk diet, there be difficulty in bringing about a regular action of the bowels, it is much better to prescribe a daily pill than to allow constipation to ensue, and then to order drastic cathartics. The following is an excellent form, and one or two of the pills may be taken either before dinner or at bed-time daily for years, without any inconvenience beyond the trouble of taking them:—Ext. aloes aquos, gr. ½; pulv. rhei, gr. j.; mastiches, gr. ij.; saponis, gr. ij. Misce, fiat pil. I have known a pill of this kind to be taken for years, and instead of its effect diminishing, the amount has had to be decreased to one-half. If there is regularity of the bowels on the whole, with only occasional constipation, a small quantity of podophylline, ¼ of a grain, and 4 or 5 grains of the compound colocynth pill, or compound colocynth pill with hyoscyamus, act very satisfactorily, the latter combination seldom producing griping or inconvenience. The non-advisability of administering mercurials, even as purgatives, need hardly be insisted on.

If there *are* pallor and debility, the non-astringent salts of iron, administered in infusion of calumba, are occasionally useful, from 3 to 5 grains in an ounce of the infusion being taken three times daily, an hour after food. But I am quite convinced, as I have observed elsewhere with reference to another form of disease, that more care than is usual must be exercised in giving iron in any form—but more especially in the one most frequently used, that of the tincture of the sesquichloride—in all forms of the disease, but especially when there is much cardiac hypertrophy, however great the pallor may be. I cannot be mistaken in the belief that I have seen serious inconvenience, such as severe headache, diminished flow of urine, and increase of the dropsy, where dropsy has existed, result from the administration of this form of the drug. It has seemed to me that one of the best methods of administering the iron, when it is proper to give it, is as a citrate, in combination with free citric acid and citrate of ammonia, something after the manner recommended by Dr. Basham. The following is a very nice form, which I have employed for years in hospital and private practice:—Citrate of iron, gr. 5; citric acid, gr. 5; liq. ammoniæ citratis, 4 oz.; syrupi aurantii, ʒiv.; and either water or infusion of calumba to 8 oz. One ounce three times a day, an hour after meals. Or the same preparation, the citrate, may be given in the effervescing form. Forty grains of it and 80 grains of citric acid dissolved in 8 oz. of water, sweetened with syrup of oranges or other flavouring ingredient, make a palatable mixture, of which an ounce may be given three times daily, with 15 grains of bicarbonate of potash in a state of effervescence. It is best to drop the powder—the fifteen grains of the bicarbonate—on to the mixture.

If excessive headache occurs, a mustard plaister should be applied to the nape of the neck, and, if necessary, aperient medicine administered. Of course, where it can be avoided, it is advisable not to counter-irritate, either with cantharides or turpentine.

There seems to be clinical evidence for believing that much relief is often afforded to the symptoms by the administration of digitalis. How this result is brought about I cannot pretend to say, nor am I yet perfectly convinced, notwithstanding all that has been advanced in its favour, that the benefit may not have been due to other causes. That benefit has in more than one case within my own experience *followed* the employment of the drug—relief to headache especially—I am quite certain, whether it has been *caused* by it or not; and it only requires that the instances of such sequential benefit be sufficiently numerous to warrant the conclusion that it is not only sequential but consequential—a conclusion which would, under such circumstances, be rigidly scientific, even if we should never be able to determine by microscopical, chemical, or other means, precisely *how* the result was attained.

In the condition of uræmic convulsions or coma that sometimes almost suddenly makes its appearance, both in this and acute renal inflammation, what can be done? The following practice is useful under different circumstances:—Bleeding, by venesection, leeching, or cupping; purgation; the hot-air or warm bath, with diaphoretics. I have given illustrations of all these methods of treatment, and believe that one or all of them may be usefully employed according to circumstances. With reference to them, I may offer the following brief experimental evidence, and leave the reader to judge how far it may usefully influence his practice:—

1. A stout, full-blooded woman, thought to be somewhat advanced in pregnancy. Violent uræmic convulsions, with intervening coma. Heart's action powerful. Bled to 12 oz. Speedy recovery of consciousness. Continued fairly well, with merely occasional vertigo, eleven months afterwards.

2. A stout, full-blooded gentleman. Intense headache. Partial consciousness. Cardiac hypertrophy. Albuminuria. Bled to 8 oz. Very speedy relief, which was maintained.

3. Male, in status epilepticus. Face flushed. Habit full. Death believed to be imminent. Bromide of potassium in large doses injected into the bowel with no effect. Nitrite of amyl inhaled; no effect. Bleeding to 14 oz. Consciousness restored, so that the wife could be conversed with, and instructions given as to disposition of effects. Death by recurring coma on the third day. Advanced kidney disease.

4. Male, aged 50. Full habit of body. Blue nose and lips. Blue, wet tongue. Much cardiac enlargement. Became almost unconscious, being with great difficulty made to give a short, stupid answer, and instantly lapsing again into stupor. Four ounces of blood taken. Apparent temporary amelioration, but sank the same night. Heart, when freed from clot, weighed 1½ lb. Kidneys granular.

5. Acute uræmic convulsions, followed by coma. Male, 24. No cardiac enlargement. General pallor. Counter-irritation to loins and back of head. Diaphoretics. Immediate restoration to consciousness. Death many weeks afterwards from œdema of lungs, &c., due to the kidney disease.

6. Male, suddenly unconscious. Surface cold. Heart's action regular. Hot-air bath. Hot cotton-wool to extremities. Ozonic ether internally. Immediate recovery. Death months afterwards. Kidneys typically granular. Great cardiac hypertrophy.

7. Lady, aged 33. Seen June 22, 1878, with Drs. Robertson and A. C. Hughes. Successive uræmic convulsions for many hours, with intervening coma. Skin dry, hot. Pulse, resisting, 140. Evidences of cardiac hypertrophy.

Had been many weeks ill from blood-poisoning following childbirth. Temples freely leeched. Consciousness shortly afterwards fully restored. Death one week later from œdema of lungs and general blood-poisoning.

8. Female, aged 25. Uræmic convulsions and coma. History of previous privation. Pneumonia. Debility. Warmth to surface. Counter-irritation. Diaphoretics when consciousness was restored. Recovery.

Circumstances influencing the practice of blood-letting.— The circumstances that chiefly influence me in taking blood or not are tension and rapidity of the pulse; age of the patient; presence or absence of anæmia.

If the pulse is very resisting and quick, I think blood may always be safely and advantageously taken, even though the patient be anæmic. Such a case was No. 7. If the patient be full-blooded, with a moderately resisting pulse, it may also be taken even if he be somewhat advanced in life. Such were cases 1, 2 and 3.

If the pulse is of low tension, the surface cool, or there be any indication of debility, bleeding will do harm, even if there be great cardiac hypertrophy (as in case 6). Then, heat to the surface and counter-irritation will be more serviceable (cases 6 and 8).

If headache occur, independently of coma or convulsions, and be associated with vascular fulness, the face being flushed and the carotids throbbing, the application of 10 or 12 leeches, wet cupping, and even venesection, will give great relief.

The tendency to fatty degeneration of the enlarged heart should not be forgotten. If this degeneration has at all advanced, the pulse will be soft, and the second sound non-accentuated, even if the heart is very large. However pronounced coma might be, bleeding under such conditions would be either useless or injurious.

Anæmia, at an age above 50, though not perhaps absolutely contra-indicative of bleeding, would, in the vast majority of cases, be so.

Can the vomiting be relieved? Sometimes it can, sometimes not. I think bismuth, in powder, is most likely to relieve it, if regulation of the diet does not succeed. But not unfrequently a meal can be retained by first administering a warm drink, such as a cup of tea, and, immediately after it has been rejected, the food, which will then sometimes be retained.

The possibility of the disease being associated with lead-poisoning or gout, should, of course, always be borne in mind, and where such an association exists, the medicinal treatment appropriate to either affection be conjoined with the other remedies employed.*

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* I believe that, widely though the knowledge of injury to health by various trades has extended, we, as a profession, are not yet sufficiently alive to the multitudinous occupations which may cause more or less impregnation of the system with lead. In the *Traité d'hygiène publique et privée* of M. Proust (Paris, 1878), is a very remarkable table in which the numerous businesses requiring for their conduct the dealing with lead or some of its compounds are set forth; and I believe that the perusal of this table would surprise most people.

CHAPTER VIII.

OF CASES GIVING THE COMBINED SYMPTOMS OF THOSE DESCRIBED IN CHAPTERS III. AND V., OR MIXED CASES OF PARENCHYMATOUS AND CIRRHOTIC DISEASE.

DR. GRAINGER STEWART, in his interesting work on "Bright's Diseases," describes three stages of the inflammatory form, *i.e.*, of parenchymatous inflammation, the last being that of atrophy. Without denying the possibility of there being such a stage, I do not consider that the evidence he adduces is sufficient to establish it. I have certainly, again and again, seen cases resembling the three, which he gives as illustrations of it; but it has seemed to me more reasonable to regard these as instances of parenchymatous nephritis superinduced upon the interstitial form of disease after this had attained a greater or less degree of development.

My reasons for as yet hesitating to accept this third or atrophic stage are as follow:—

1stly. Many patients—I should say the vast majority of those affected—though, for, it may be, a very long time, the subjects of chronic parenchymatous nephritis, and though dying from the effects of that disease, are found post-mortem to have the large white kidney, such as those mentioned in pp. 28 and 98, although there had been ample time for the development of the stage of atrophy.

2ndly. Interstitial nephritis is a most insidious disease. A person may be the subject of it possibly for years, and yet appear to himself and others to be healthy. There is no reason that I am acquainted with why parenchymatous nephritis should not attack one affected with it. Yet, if it did, he would be sure to say that at the onset of the attack he was healthy; and if he died, his kidneys would present appearances characteristic of both diseases.*

I am persuaded that such mixed cases often occur. Dr. Stewart himself gives an illustration in his 20th chapter of acute inflammatory disease superinduced upon the cirrhotic form, introducing it by the words, "Particularly in the later stages of the cirrhotic diseases inflammation of the tubules is apt to supervene." But, so far as I am aware, there is no evidence in support of the implication contained in those words, that the earlier stages are not as liable to parenchymatous inflammatory attacks as the later; and I shall now give examples of what I conceive to be such mixed cases, in some of which the parenchymatous or tubular inflammation had occurred while yet the cirrhotic process was not so far advanced as to shut out all hope of amelioration, while in others the kidneys had undergone so much previous change, that the superadded inflammation soon terminated life. It is mainly because the cases that I have seen could be best interpreted—and some of them apparently only interpreted—on the hypothesis of their mixed character, that I venture to hesitate to accept Dr. Stewart's third stage until the evidence for it becomes more conclusive. Of the latter class—*i.e.*, the class where, if it be said that the tubuli, from being denuded of epithelium, *must* contract, it is a sufficient reply to point to cases in which, after symptoms of parenchymatous nephritis have existed for years (and in which, presumably, therefore the denudation should have been complete, if ever it could be so), the kidneys have nevertheless been found not only not contracted, but much larger than normal. Of the class of cases where the hypothesis of a mixed disease seems the only possible one, the case of J. Coffey is an example. It was a case where the hypertrophied heart and history of frequent and long-continued nocturnal micturition pointed to old cirrhosis, during the existence of which the patient thought himself in good health, while general œdema and scanty, and at first smoky, urine pointed equally to a recent inflammatory attack; and lastly, where post-mortem examination showed a contracted kidney with a white cortex, that had all the appearance of that of chronic parenchymatous nephritis.

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* I am assuming here what, in spite of the very high authority of Dr. George Johnson and Professor Charcot, I think the balance of evidence is as yet in favour of, viz., the general occurrence of cirrhosis independently of any necessary antecedent change, inflammatory or otherwise, of the epithelium.

Another case, I believe of a similar kind, where, however, great amelioration took place in all the symptoms, and the patient left the hospital, is given at p. 101.

Having said thus much, I will give illustrative cases.

CASE 32.—MIXED INTERSTITIAL AND PARENCHYMATOUS NEPHRITIS. ALBUMINURIC RETINITIS. ASCITES. FREQUENT TAPPING. DEATH.

John Coffey, a sailor, aged 40, was admitted into the Royal Southern Hospital, under my care, on November 27, 1877. He was a large-boned man, fairly nourished, but very pale. He stated that he had been quite well and performing, without any inconvenience, his duties as an able-bodied seaman up to two months previously, when, after sleeping on deck in wet clothes, his urine became very scanty, and his limbs and face swelled. He had burning pain and straining on passing water. On admission, his lower limbs, abdominal and chest walls and face were very œdematous, and there was fluid beneath the conjunctivæ. He complained of cough and shortness of breath, but the pulmonary sounds were fairly healthy, The heart was decidedly hypertrophied. Its impulse, which could be but indistinctly made out, was below and to the outside of the left nipple. The area of dulness was greater than normal. The first sound was but faintly heard at and near the point of impulse, but there was decided accentuation of the second sound at the second right costal cartilage. The pulse was resistant, regular, 96, Tongue clean; the bowels had been slightly relaxed. He suffered much from dyspepsia, but had no vomiting. The urine passed first after admission had a specific gravity of 1·018, and contained much albumen. On the following day he drank 90 oz. and passed as urine only 6 oz. This urine was turbid; specific gravity 1·022, and very albuminous; contained scarcely any chlorides, but a good deal of pus. It was examined microscopically on this and several subsequent occasions, and was found to contain numerous pus cells and a few small hyaline casts.

The case was diagnosed as one of chronic atrophy of the kidneys, on which had supervened acute parenchymatous inflammation, now becoming chronic.

The following mixture was prescribed:—Citrate of iron, gr. 40; acidi citrici, gr. 60; liq. am. citratis, 4 oz; aq. to 8 oz. One ounce three times daily. Milk diet. Three grains of pepsine three times daily with food. The hot-air bath to be used and sweating to be encouraged by warm drinks during its employment.

He perspired but little during the first, though freely during the second bath.

On December 5th, he complained of headache and of feeling sick; of the almost total loss of sight in his left eye. The sight of the right one had long ago been impaired, owing to an accident. I examined the left eye with the ophthalmoscope, and made the following note:—"Small white glistening patches sprinkled over the retina, especially along the line of the vessels; disk reddish, woolly, very ill defined."

The œdema, after a slight subsidence, increased. On the 11th, I introduced a trocar into the subcutaneous cellular tissue of the thorax, from which during the succeeding twelve hours 24 oz. of clear fluid escaped. This fluid was straw coloured, specific gravity 1·010, contained a small loose coagulum, not much albumen, and ·15 per cent. of urea. The trocar was coughed out during the night, and for a few days the point of entrance was surrounded by an erythematous blush. On the 15th he vomited about an ounce of green fluid. Up to that time he had complained occasionally of a feeling of nausea, and had once retched, but had not actually been sick. He suffered a good deal also from occasional headaches. On the 18th, it was noted that there was fluid in the abdominal cavity; on the 20th, that this was increased. The bowels were kept open by compound jalap powder, and efforts were made to promote the action of the skin by the hot-air bath and diaphoretics; but as the induced perspiration was but slight, and much distress was complained of, while the abdomen was becoming inconveniently tense, I had paracentesis performed on the 20th January, 225 oz. of clear serum being withdrawn. This afforded much temporary relief, but there was a rapid reaccumulation, so that the operation had to be repeated on the 28th of the same month, and again on February 6th, 376 and 370 oz. respectively being drawn off. On the third night after the last tapping, the pad that had been placed over the puncture became loosened by coughing, and there was a great discharge of peritoneal fluid into his bed. This discharge kept up till the evening of the 11th. 264 oz. were withdrawn, by tapping, on the 26th, and 268 oz. on March 9th. On the 26th, while the peritoneal cavity was being evacuated, I drew off, also by means of a very fine trocar, a considerable quantity of fluid from the cellular tissue over the right calf. This had a specific gravity of 1·011, was pale, slightly opalescent, contained a few floating films, ·15 per cent. of urea, and ¼ albumen; the ascitic fluid had a specific gravity of 1·013, was less pale but clear, urea ·2 per cent, albumen ½.*

The puncture in the skin over the calf continued to discharge very freely until after the next tapping, when, the pressure from above being thus taken off, collodion restrained it, though until this was done none of the means employed had any effect. The abdominal puncture also again discharged for several days. On the 18th of March he vomited. On the 21st both sides of the chest were dull; the left one posteriorly (as the patient sat up) to the level of the angle of the scapula. On the 22nd, the urine fell from 22 oz. to 13 oz., and was distinctly smoky, and when examined microscopically was found to contain red blood cells, crystals of triple phosphate, and pus cells. No casts were distinguishable. The quantity on the 23rd was the same. On the 25th it had fallen to 9 oz.—4 oz. by day, specific gravity 1·014; 5 oz. by night, specific gravity 1·013. On the 23rd, the day after the marked diminution in the quantity of urine, severe vomiting came, and continued for several days, indeed almost to his death, which took place on the morning of the 26th. The vomited matter was green, somewhat gelatinous, and gave a play of colours with nitric acid such as is produced by the colouring matter of bile. I regret that I was unable to examine it more completely, as I have very little doubt that it would have been found, as in a case previously narrated (*vide* p. 137), to contain much urea; for at this, the only time of persistent vomiting, the bowels also were for several days inactive, the skin quite dry, and the urine much diminished in amount. Up to the 20th, the bowels had been kept regular by the occasional administration of compound jalap powder; a saturated solution of bitartrate of potash, or $\frac{1}{12}$ gr. of elaterium; one or the other being employed according to circumstances. On the 23rd, after three days of constipation, a simple enema induced a copious evacuation. He gradually became exhausted, and died on the morning of the 26th, no uræmic symptoms, except that of vomiting, having manifested themselves.

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* *i.e.* albumen occupied ¼ (and in the case of the ascitic fluid ½) of the height of the fluid in the test-tube.

In the above case there was a mixture of two sets of symptoms; the one referable to the condition of kidney now generally known as parenchymatous nephritis, the other to that of granular degeneration or cirrhosis of the organ. Thus the patient had dropsy, which had come on acutely after a definite exposure to cold and wet, and had been ushered in by a marked diminution in the secretion of urine, circumstances which pointed to the former of these affections. But he had also a hypertrophied left ventricle, without valvular disease, a resisting pulse, and albuminuric retinitis, conditions which as commonly accompany the second, Considering, therefore, the insidious way in which the latter affection originates and progresses, and the frequency with which people consider themselves quite well until some accidental circumstance leads to the discovery that they must have been the subjects of it for a considerable time, I did not attach too much importance to the fact that up to eight weeks before admission the patient had been perfectly well able to perform his duties without the consciousness of any illness, but concluded that his kidneys were at that time, and had probably for a long time previously been, undergoing a process of atrophy, and that then, as the result of prolonged exposure to wet, there was superinduced on them a lesion of another character, and one marked by other symptoms. The post-mortem examination fully justified this opinion, which was again and again expressed.

This was made twenty-four hours after death. The lower limbs were moderately œdematous. A large quantity of serous fluid was found in the pleuræ, pericardium, and peritoneum respectively. The heart was considerably hypertrophied, the hypertrophy affecting the left ventricle only. The wall of this cavity was 1¼ inch in thickness. The muscular tissue was healthy, and all the valves were competent. All the cavities were empty. The weight was 21 oz. The aorta was elastic and free from morbid change. The lungs were healthy. The upper part of the right costal pleura was united to the chest wall by old adhesions.

Liver healthy; weight, 3 lbs.

Stomach: the mucous membrane generally looked healthy. The pyloric orifice was thickened, but not constricted. The small intestine was quite empty, but its walls of a normal thickness, and the mucous membrane apparently healthy. There was no œdema of the submucous tissue. The large bowel was full of consolidated slate-coloured fæces, the bowel itself being normal. Pancreas and spleen normal.

Kidneys: the right weighed 4$\frac{3}{4}$, and the left a little under 4 oz. The capsules were adherent in places, and the surfaces of the organs very irregular, owing to innumerable minute rounded granulations. These were paler than the intervening tissue, and stood out from the surface like small yellowish-white beads. A number of small cysts were scattered among the granulations. The cortex was pale, mottled, and much diminished in amount. A number of white opaque dots and lines were visible in the cortex, and along the radii of the cones. Some of the latter, when viewed under rather low powers (Beck's $\frac{2}{3}$ with No. 3 eye-piece), were found to consist of acicular crystals, many of which radiated from a single point. These were slowly dissolved by acetic acid.

The specific gravity of the kidney was 1·039; and it broke with a weight of 10 lbs. 10 oz.

The brain was generally pale. The ventricles, like the other serous cavities, contained a good deal of fluid. In the substance of the poms on its right side and anterior aspect, just beneath the transverse fibres, was a small clot of disorganised blood, evidently of some age. The arteries of the base, the small arteries of the pia mater, and of the mesentery were examined by low powers and found thickened.

It is worth remarking that the condition of the kidneys did not seem to justify the terms "tough" and "dense," so often applied to them in this disease. I most carefully took the specific gravity of one of these kidneys, and then compared it with that of the kidney of a healthy man of about the same age, who had been killed by an accident. In the first case, it was 1·039; in the second, 1·054. Using the term "dense," then, in its more narrow and technical sense, the diseased kidney was less dense than the healthy one. I then drilled similar holes at corresponding parts in each kidney, and, having successively passed the same broad tape through these holes, after suspending the organs by means of a similar tape passed through a hole at an equal distance from the other extremity, gradually weighted the lower tape until the structure was torn through, and the weights fell. The healthy kidney bore a strain of 11 lbs.; the diseased one, only of 10 lbs. 10 oz. What difference in resistance really existed then was in favour of the healthy organ, and not, as the general description would seem to imply, of the diseased one.

I should remark also that I do not mean to imply, when I say that albuminuric retinitis commonly accompanies the granular kidney, that it is not found associated with other morbid states of the organ; as I have several times seen it in patients undoubtedly the subjects of chronic parenchymatous nephritis.

Case 33.

Thus, in the case of Cornelius Carr, a man aged 34, who died on December 16th, 1876, and whose kidneys were typical examples of that disease, one (the right) weighing 9½ oz., and the other 12 oz., ophthalmoscopic examination made on the 20th of November revealed numerous characteristic white gleaming patches over the retina of the right eye. The patient complained for the first time on that day, though he had been in hospital since the 19th of the preceding month, of dimness of vision with that eye, and was unable, when the left one was closed, to read the large letters of my name, at the head of the hospital card, at a greater distance than three feet.

It seems to me more reasonable to regard J. Coffey's case as one of acute parenchymatous nephritis superinduced on a kidney previously the subject of the cirrhotic form of disease, than to consider that the organ had been originally affected with the former variety, but had passed into the so-called third or atrophic stage. The great amount of hypertrophy of the left ventricle indicated a disease of long duration, but the dropsy had only existed for a short time, and had immediately followed a definite exposure to cold and wet. In many other cases of the chronic parenchymatous form of disease that I had, as in some respects, allied in some of its clinical features to the foregoing, though differing in others, I may mention the following case:—

Case 34.

On August 25th, 1877, I was hastily summoned to see a gentleman, aged about 60, who was said to be very ill. I found him complaining of very intense headache. He had vomited a great deal during the morning and preceding night, but the stomach had since become quiet, and he had been, and continued to be, slightly delirious. The heart's impulse was diffused and powerful, and the radial pulse hard and resisting, but quite regular. There were no abnormal cardiac sounds. The bowels were constipated. Tongue clean and denuded of epithelium on one side, coated on the other. He was troubled with chronic eczema of the face, which nothing would cure. There was no œdema. I learnt that he had been lately the subject of great mental anxiety, owing to an unexpected domestic bereavement. It transpired also, that two years previously he had had some kind of nervous seizure, which was followed by temporary loss of power in the right hand. Since that time, however, he had considered himself quite well, and had been actively conducting his business, which was a very extensive one. On my enquiring as to the condition of the urine, I was told that it was quite natural and in fair quantity, and that the kidneys were healthy. On asking how this was known, I found further that, at the time of the attack above alluded to, he had consulted two of the leading physicians in Edinburgh, but that, though there was something wrong with the kidneys, these organs had since attained their usual health. On examining the urine recently passed I found it pale, opalescent, with specific gravity 1·029, and very albuminous.

An active aperient of sulphate of magnesia was prescribed for immediate use; sinapisms were directed to be applied to the back of the neck, and, so soon as the bowels had freely acted, an effervescing saline four times daily, in each dose of which were 15 gr. of bicarbonate of potash in an ounce of water, neutralized by 10 gr. of citric acid. Rest in bed. Small quantities of warm beef-tea and milk.

The next day I was able to make a more complete examination of the urine. It was passed in fair, but by no means excessive, quantity, from 1½ to 2 pints within the twenty-four hours; was quite clear, and during the first twenty-four hours threw down scarcely any deposit. It was of a straw colour, acid, and very albuminous, the albumen quickly subsiding, and, after having stood for four hours, filling about a fourth of the space occupied by the urine. Its specific gravity was 1·020, and it contained ·2 per cent. of urea. Though there was but a very slight deposit, yet in this there were many small, almost completely transparent casts. After having stood for twenty-four hours, there separated from it, probably owing to that natural increase of acidity which takes place in urine for some hours after it has been voided, many crystals of uric acid. I attended this gentleman for some time, and gave him precise directions, which he appeared fully to appreciate, for his guidance. They were just such as I have sketched in another page, viz., abstinence from even the moderate stimulants that had been taken, a gradual change of the diet in the direction of milk, with diminution of the amount of meat; the diminished employment, and at length entire disuse of oatmeal; moderate exercise on level ground; the avoidance of a close atmosphere in the sitting room at night, &c., with the additional one of permanent retirement from the more active duties of business. His health, when I last saw him, was greatly improved, but the urine, although it was of good specific gravity, and had quite the average quantity of urea, still contained albumen.

There can be no doubt that this patient was the subject of granular degeneration of the kidney, associated in all probability with nephritis of the kind which issues in the large white kidney. The headache, vomiting, high arterial tension, cardiac hypertrophy without valvular disease recurring, œdema and albuminous urine, afforded certain evidence of this. Though unusual, it is not unprecedented to have so large an amount of urea eliminated, for Dr. G. Stewart has instanced a case in which the proportion of this substance was even greater than normal.

I have already related another case in which it remained for a long time very high. *Vide* p. 155.

CASE 35.—MIXED CIRRHOSIS AND PARENCHYMATOUS DISEASE. SUPPRESSION OF URINE. RELIEF.

Mr. K., aged about 50, seen with Dr. Evans on the 15th of August, 1876.

The patient was a stout man, but very pallid. He was propped up in bed, breathing quickly and looking somewhat distressed. The legs and feet were œdematous, but the œdema was only of four days' duration. On this point he was very certain. Up to four days ago he declared that he had never had any swelling. He had been obliged for some years past to rise in the night in order to make water, and the quantity of urine passed was, he thought, very large. The urine passed at the time of examination was clear, pale, acid, had a specific gravity of 1·018, and was very albuminous. The heart was greatly hypertrophied, though there was no valvular disease, the apex beat being felt outside the nipple line, between his sixth and seventh rib. The pulse was small, but hard and incompressible.

For four years this patient had been obliged to rise once or twice every night to make water, but he had always considered himself well until the present attack; and he was quite positive that he had not suffered from dropsy. Yet the symptoms left no room for doubt that he was the subject of advanced organic disease of the kidneys, the organ having probably for a long time been undergoing a slow process of contraction, and the condition at the time of our consultation being that of a parenchymatous inflammatory attack superinduced upon the cirrhosed state.

The large quantities of pale urine of low specific gravity which he usually passed, the greatly hypertrophied heart, the thickened arteries, all tended to prove this, and to render great caution in the prognosis necessary, for autumn was approaching, and nothing is commoner in such cases than apoplexy on the approach of cold weather after any chill to the surface.

As there had been a sudden and almost complete suppression of urine on the day previous to my seeing the patient, Dr. Evans had dry-cupped the loins, and given acetate of ammonia mixture, with small doses of digitalis. We decided to repeat the dry-cupping and mixture, and, in addition, to allow as a drink a saturated solution of bitartrate of potash, and administer a powder containing 40 gr. of pulv. jalapæ co. and $\frac{1}{8}$ gr. of elaterium twice a week; to limit the patient to a diet of milk, with small quantities of beef-tea, and to keep him in an atmosphere of not under 60° F.

I learned sometime afterwards from Dr. Evans that the treatment was followed by relief. The ultimate issue of the case is not known to me, and I merely report it as an example of the union of the two affections, about which there cannot be much doubt; for the heart could not possibly have attained its large size in four days or four weeks; while the patient could not have been the subject of a previous parenchymatous nephritis, issuing in atrophy of the kidney, without having ever once been the subject of dropsy. Yet he was quite positive that until four days before our visit he had never had swelling of any kind.

Another example of this mixed disease is reported at pp. 101–2, under the head of Chronic Kidney Disease with Dropsy. For reasons already given, I believe that such cases are far commoner than is generally believed.

CHAPTER IX.

CASES IN WHICH HÆMATURIA FORMED THE MOST PROMINENT AND PERSISTENT FEATURE (INCLUDING CASES OF HÆMATURIA NOT DEPENDENT ON DISEASE OF THE KIDNEYS).

THE subject of hæmaturia is one of very great interest and importance. Any change of colour in the urine is generally early remarked by the patient, who, if the change be caused by blood, in alarm seeks advice as to the cause. Usually it is not difficult to determine this, the general and miscroscopical examination of the urine most frequently affording sufficient evidence as to whether the source of the hæmorrhage has been the kidney, the bladder, or one or other of the urinary passages, and collateral circumstances and symptoms generally affording the grounds for determining with accuracy what particular leison has given rise to the loss of blood.

When one reflects on the delicacy of the ultimate renal structures, and on the frequency with which, under comparatively slight pressure, extravasations of fluid occur during attempts made to inject the organ for microscopic purposes, it is a matter of some wonder that hæmaturia is not of very frequent, instead of very rare, occurrence. A pressure of from 50 to 100 m.m. of mercury will often force the injection through the walls of the uriniferous tubules of the kidneys of mammalian animals, when attempts are made to inject these through the ureters. Yet the finest of these tubules is dense in structure compared with that of the capillaries of the glomerulus. There can be no doubt, too, that the blood pressure in the renal artery varies very considerably at different times; and yet it is rare for the capillaries of the organ to give way even under circumstances—such as prolonged exposure of the surface of the body to cold, &c.—which might be supposed to raise that pressure to a very high degree. The comparative immunity of these vessels from rupture under such circumstances is rendered all the more remarkable from the fact that they so readily break down under the irritating effects of certain drugs. Turpentine, when injected, circulates through all parts of the body, but in no part is there usually any capillary bleeding but in the kidney. Some system of compensation must operate to preserve structures so obviously delicate from the disastrous effects they would be liable to suffer, owing to the extreme variety of pressure to which the blood flowing through them would otherwise be subject. The anatomical peculiarities of the kidney's blood-vascular system, and particularly its "duplex capillarisation," and the relation which the vas efferens bears to the capillaries of the glomerulus, will help to explain this immunity. But perhaps the greatest source of safety is the fact that in any merely physical increase in tension—*i.e.*, an increase unaccompanied by inflammatory changes—there is an immediate transudation of the watery portion of the blood, and a consequent lowering of the pressure. Thus, owing probably to this safety-valve action, a person in a high state of fever may be again and again immersed in a cold bath, with no other effect on the urine than an increase in its quantity and a relative decrease in its specific gravity. I myself have given as many as eleven such baths to a patient suffering from rheumatic fever with very high temperature, and yet have been unable, by the most careful examination, to detect any trace of albumen in the urine. (Vide *Lancet*, January 6th, 1877.)

In general, it is very easy to detect blood in the urine. When it is in sufficient amount to give a distinct blood colour, or when clots have been formed and discharged, there can of course be no room for doubt. It may be as well to remark, in passing, that much information can be sometimes gained by laying out the discharged clots in cold water, and noticing their shapes, as has been well shown by Mr. Hilton in lectures published in *Guy's Hospital Reports* for 1868. It is only when the blood is in very small quantity, or has had its usual appearance strongly modified by an ammoniacal condition of the urine, or when the urine itself has been rendered smoky in appearance owing to the exhibition of carbolic acid, that any real difficulty can arise. But, with care, blood can be detected even when in very minute quantity, and when the presence of ammonia in large amount has so altered the structure and appearance of the red corpuscles as to render them incapable of recognition under the microscope. A very good example of this occurred to me a year or two ago. A patient was admitted suffering from anasarca and ascites. His disease, he said, was of recent origin and had resulted, he thought, from exposure. The urine, however, was found to be very ammoniacal and slightly smoky; but, on examination, no evidence of the presence of blood could be obtained either by the microscope or spectroscope. Possibly the micro-spectroscope might have led to the detection of the characteristic absorption bands; but, examining by means of the double-prism spectroscope the light transmitted through a thickish layer of the urine, I failed to detect the faintest absorption bands, although they were very distinct when a layer of much diluted blood was made to take the place of the urine before the slit of the instrument. By the application of the guaiacum test, however, the detection was easy; and as it is just possible that some may not be acquainted with this test, it may be as well to detail the steps by which it is applied, referring the reader for fuller details to an able paper by Dr. Alfred Swayne Taylor, in the 13th vol. of the *Guy's Hospital Reports*, 3rd series, pp. 431, *et seq.* A piece of white filtering paper was first wetted with a tincture of guaiacum. On to the wetted portion two or three drops of the suspected urine were then let fall, and lastly a little solution of peroxide of hydrogen or of the so-called ozonic ether dropped on to these. A faint blue stain was soon developed at the spot where the urine had fallen; and the development of this stain indicated the presence of blood. This test, originated, I believe, by Dr. Day, of Geelong, may be variously modified for the detection of blood under a variety of circumstances, but the above is probably the best method of applying it for the purpose of determining the presence of that fluid in urine. "A saturated solution of guaiacum should be made, the inner portions of the resin which have not been changed in colour by air or light being selected for this purpose. The solution should be preserved from light by being kept in a bottle covered with black paper, or in a dark closet." The blue colour results from the oxidation of the resin deposited from the tincture, a change which the red colouring matter of the blood is itself quite incapable of effecting. Any of the solutions containing antozone or the solid antozonides are equally incapable, when alone, of producing the change. Peroxide of hydrogen, ozonic ether, peroxide of barium, the so-called ozonized essential oils, all alike fail of themselves to produce the blue tint when applied to the resin, but will, each and all alike, produce it when applied to it in the presence of the red colouring matter of blood. No other red colouring matter, capable of being mistaken for blood, will produce the blue stain in presence of antozone. Dr. Taylor has examined a great number, such as cochineal, the colouring principles of fruit, flowers, and leaves, red ink, &c., but always with a negative result. The age of the blood does not affect the test. It may be many years old, or only recently withdrawn. The test is equally good in either case.

The causes of hæmaturia are very various, even when the kidney is the source whence the blood is derived. But, of course, the urine may be stained by blood from any part of the tract necessarily traversed by it, as well as through collateral channels leading into this tract. Besides the kidneys, therefore, the ureter, the bladder, the vas deferens, the prostate, and the different portions of the urethra may all be sources of bleeding. Some of these will come more especially under the notice of the surgeon, and to such only a brief allusion will be made here.

If the urethra or the vas deferens be the source of the bleeding, the blood, when the patient micturates, will precede the urine, for hæmorrhage cannot make its way backwards along the line of greatest resistance, as it would have to do in order to reach the bladder from the urethra. If the patient be made to micturate in the presence of the examiner, and a few drops or more of pure blood trickle forth first, followed by a more or less copious flow of urine, the source of the bleeding is certainly either directly anterior to the bladder, or the blood is discharged into the urethra from some of the passages communicating with it. A sensation as of something suddenly giving way in the groin under exertion, accompanied by pain, and followed by the trickling of arterial blood from the urethra shortly afterwards (while unstained urine could be withdrawn from the bladder by the catheter), with the occurrence, after the course of a day or two, of swelling and tenderness along the course of the spermatic cord within the inguinal canal, are the features mentioned by Mr. Hilton in the admirable papers referred to above,* as indicating, in his opinion, an injury to the small artery within the vas deferens in three obscure cases of urethral hæmorrhage that had come under his notice.

With this very brief allusion to urethral hæmorrhage I will adduce cases in illustration of hæmaturia, in which the blood has originated either in the bladder, ureter, or kidneys.

CASE 36.—HÆMORRHAGE FROM THE PROSTATIC PORTION OF THE BLADDER AND THE PROSTATE. VERY PURULENT URINE. ADVANTAGE OF COPAIBA AND CUBEBS. CURE.

P. McAndrew, aged 38, a seaman, was admitted into the Royal Southern Hospital, under my care, on January 8th, 1878. He was a hardy-looking, spare, but muscular man. He said that nine days previously, while in Liverpool, he for the first time noticed blood in his urine, the blood flowing at the end of passing the water and being attended by much pain and straining. For the next hour or two after having passed blood he was obliged to micturate very frequently, also with pain and straining. Then he would feel easy, and the freedom from pain would last for seven or eight hours, the urine during that time being free from blood. The pain was not increased by walking. He had never passed any fragments of stone. Sometimes clots of blood would be voided. He had had instruments passed in Valparaiso in August, 1877, for stricture, but asserted positively that he had been well and had not contracted gonorrhœa since. The sample of his urine, which, by direction of the medical man who sent him in, he brought in a bottle, was very bloody, and, besides, contained coagula and much pus, the whole mixed up together.

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* Clinical Lectures by John Hilton, F.R.S., in *Guy's Hospital Reports* for 1868, pp. 23 *et seq.*

During the first 17 hours he passed 26 oz. of urine—6 oz. from 3 p.m. to 8 p.m., and 20 oz. from 8 p.m. to 8 a.m. So far as it was fair to judge from the experience of so short a time he appeared, therefore, to pass much more by night than by day. During the next 24 hours there was a similar difference in the quantity of the day and night urine—the former amounting to but 9 oz., the latter to 20 oz. He said that he had been obliged to get up at 4 a.m. to pass water, that blood came with intense pain and straining after he had done micturating, that then he was obliged to remain up during all the rest of the morning, owing to the frequent recurrence of this painful straining; that most of what he passed was blood, but that, later on, urine had been since voided without any blood, and, as was always the case when no blood was present, without pain. At 3 p.m. I got him to pass urine in my presence, it having been retained since 9 a.m. Ten ounces, containing very much pus but no blood, were passed first, apparently with little or no suffering; then, after a moment's interval, a teaspoonful of bright blood, with much straining and pain. After this he suffered for some time severe darting pains in the perinæum and urethra, which he said prevented him from lying down.

The treatment was as follows:—Rest in bed. Belladonna (ʒ ij of the extract to ℥ ij water) to be smeared over the region of the bladder and the perinæum, and to be followed by a hot poultice. A warm bath each night, and, the last thing, two morphia suppositories to be introduced. Milk diet, and the following mixture :—Tinct. hyoscyam 4 drachms : pot. bicarb. 3 drachms ; aquam ad 8 oz. Two table-spoonfuls three times a day. Occasional aperient when required.

The symptoms soon became mitigated in severity. On the 12th, a night draught containing 20 m. of tinct. belladonnæ was prescribed, and on the 13th two such draughts, one at bed-time and one at 2 a.m.

On the 14th he was reported to be much easier. Up to 2 a.m. had slight pain, but fell asleep after a short time and remained quite comfortable since. Throat dry, some thirst, pupils dilated. After this there was no recurrence of pain, though blood was still passed occasionally, and always pus. The note of his condition, made on the 19th, was as follows :—Slept well, no pain. Passed water twice in night, viz., 10 p.m. and 2 a.m., 8 oz. each time, and twice since, viz., 8 a.m. and 12.30 p.m., 7 oz. each time. This urine has been passed without pain or straining. It contains a considerable quantity of greenish-yellow pus, but no blood. Yesterday, 31 oz. were passed, containing a trace of blood.

The urine now began to be secreted in much larger quantity. On the 21st, 48 oz. (26 by day, 22 by night) ; 22nd, 56 oz. (42 day, 14 night). All pain having for some time disappeared, and the urine continuing very purulent, first of all sulphite of soda, in half drachm doses three times daily, and, after five days, salicylate of soda in 15 gr. doses, four times daily, were administered, in the hope of lessening the amount of this latter substance. But as neither agent produced the slightest effect in this particular, although the salicylate was abundantly excreted by the urine, a mixture containing in each dose 15 m. and 15 gr. of balsam of copaiba and powdered cubebs respectively, emulsified with 15 m. of liq. potassæ, was given three times daily. The pus began at once to diminish, and on Feb. 16 was absent. He was kept in until the 24th, the urine remaining in every respect natural, and then discharged well.

The source of the hæmorrhage in this case was the inflamed prostate and prostatic portion of the bladder. Thus, blood only appeared at the end of micturition, and then in small quantities, though, according to the patient's account, much more had previously been passed. The contraction of the bladder on the prostate caused the intense pain. That the hæmorrhage was not due to a calculus was evident from the fact that neither it nor pain was increased by movement.

The relief afforded by the morphia suppositories, warm baths, and large doses of belladonna, was very striking. Neither the sulphite nor the salicylate of soda had any effect on the pus, though this at once diminished and soon disappeared under the employment of copaiba and cubebs. Theoretically, salicylic acid and the salicylates would seem to be indicated in purulent discharges from the urinary organs. They are capable of being administered in large and frequent doses without serious inconvenience; and they are almost wholly eliminated in the urine. Yet, though I have often employed them, I have never found them of the least use either in pyelitis or chronic cystitis; whereas copaiba and cubebs will often speedily bring about a healthier condition of the mucous membrane in both diseases.

Case 37.—Vesical Hæmorrhage of long standing. Much Relief from Injection of Carbolic Acid and the Employment of Copaiba and Cubebs.

Ellen M., a cook, aged 31, was admitted into the Royal Southern Hospital on July 1st, 1873, with the following history:—She was fairly well up to two years before admission, when she began to suffer from constant dull pains in the loins. These pains were always worse at night and when the bowels were constipated. At that time—two years ago—she first noticed that there was blood in the urine. This appeared for some time only occasionally (the urine in the intervals being of a natural colour), until about a month ago, since which time it has been constantly present and much increased in quantity. It is said to be sometimes diffused through the urine, and at others to be voided in drops quite pure at the close of micturition. She has frequent desire to make water, which is passed in small quantities at a time, and always with much pain. She says that she has often observed a sandy looking sediment in the urine. There is much tenderness over the lower part of the abdomen. The urine, on being examined on the following day, was found to be bloody, to contain mucus, to be ammoniacal and albuminous. Its specific gravity was 1·020. Eighteen ounces were voided in twelve hours.

To have tinct. ergotæ 20 m.; liq. ferri sesquichloride 20 m.; aquam ad ℥j. ter. in die; also sp. terebinthinæ gtt. 20, nocte, maneque. On a subsequent examination the urine was found to be quite thick and gelatinous, with large masses of ropy mucus stained with blood at the bottom of the vessel containing it. The passage of this caused severe pain. On the 5th her other medicines were omitted, and capsules of copaiba were administered three times daily, at first one, and afterwards two for a dose, and a half grain morphia suppository was also introduced into the rectum every night. The urine began slowly to improve in character under the use of the copaiba, which was persevered with up to the 22nd, the pain over the bladder being further relieved by the external application of a liniment composed of equal parts of the liniments of aconite and belladonna. On that date, as the copaiba began to upset the stomach, its use was temporarily suspended, and the following mixture substituted:—Acid nitric diluti m. 40; liq. morph. hydrochloratis m. 60; ext. ergotæ liquidi ʒiv.; decoct pareiræ ad 8 oz.; 1 oz. ter in die. The capsules were resumed on the 26th, and taken with the above mixture, the urine getting gradually more and more clear, till at length, though it still contained at times a little mucus, the patient thought she was well enough to resume her duties, and left the hospital on Nov. 29th, 1873. On the 29th of the following July she again applied for admission. She had been in a situation as cook in a gentleman's family since leaving the hospital, and for a time had continued pretty well, but, neglecting remedies, the unfavourable symptoms gradually returned, and at length obliged her again to seek relief. The urine was not on this occasion quite so bad as on her first admission last year. Still there was a large quantity of ropy mucus deposited in it, and she had to get up five or six times every night to micturate, the act of micturition being very painful. In addition to the copaiba in capsules, which was resumed so soon as the bowels had been evacuated, I had the bladder washed out, through a double-eyed catheter, with a large quantity of a weak solution of carbolic acid (1 in 100) every second day, and immediately afterwards an injection containing gr. j. of acetate of morphia, dissolved in an ounce of water, to be introduced into the bladder and retained there. The immediate effect of the carbolic acid injection was to impart a dark and somewhat smoky hue to the urine, which, however, had no deposit thrown down in it. On the following day the urine was always quite clear and free from any trace of mucus after standing. Indeed, it had all the appearance and character of a normal urine. After the fifth injection she complained of pain, and some hours afterwards had several shivering fits, each lasting for about half an hour. Nausea came on and she could take no food. The pulse rose to 120, and the temperature to 103·6°. Much pain was complained of in the right inguinal region, intensified by coughing on pressure. The bowels acted several times. The eyes were suffused, and there was much headache. This intercurrent attack of acute cystitis, caused probably by the employment of a somewhat stronger injection than usual, was subdued in a few days by appropriate means. These consisted of eight leeches to the hypogastrium, morphia suppositories, an effervescing saline mixture every fourth hour, and the free use of diluents. The next day the pulse was 122, and the temperature 104° F. She had passed a restless night, but had slept at intervals. The bowels were opened once during the night, but the urine was passed frequently and with great pain. It was still passed a very little at a time, and contained much blood but no clots. She shivered once during the night and several times slightly in the morning, is very thirsty. There is a good deal of tenderness over the hypogastrium. Ennun opii ʒ ij nocte, in addition to other remedies. The next day, at 2 p.m., the pulse was 110, and the temperature 103° F. Urine had only been passed twice in the night, and she had slept well. The bowels acted once, without pain. Though the urine still contains much blood, there is a great diminution of the pain previously felt on voiding it. Still much tenderness over hypogastrium. The extract of belladonna to be softened with water and spread over the skin of this part, and the whole to be covered with a hot linseed meal poultice. Everything else to be continued as before. She slept well on the night of the 12th. The urine was voided four times, its character being improved. Much relief was given by the belladonna and linseed poultices. P. 104, T. 102° F. On the 16th the temperature was 99·6°, the pulse normal, and the urine all but free from discoloration. On the 19th it was quite clear, containing no trace of blood and giving no pain when voided. She then resumed the copaiba capsules, which were persevered with until she left the hospital on September 28th, apparently well. I met this patient in the street exactly a year afterwards, and found that she was then, and had been nearly ever since, in a situation. She was still occasionally taking the copaiba in the form of a mixture (as being less expensive than the capsules) as I had advised her to do when she left the hospital, but she looked and felt very well.

The hæmaturia in this case was due to hæmorrhage from the bladder, and had its source originally in an acute cystitis, which had subsequently become chronic. The condition of this patient at the time of her first admission into hospital was very miserable. The disease had then lasted two years, and had compelled her to give up her situation as a cook, for the duties of which she was rendered entirely unfit by the incessant pain and irritation of which she was the subject. The urine was very bloody, almost semi-solid, from the large amount of mucus contained in it, was extremely ammoniacal, and was voided with great frequency and much pain. I think the case exemplifies in a striking manner the advantages of a persevering employment of copaiba under such circumstances, and, as well, the utility of frequently washing the bladder out with a very diluted solution of carbolic acid; for although from the employment on one occasion of a stronger solution than usual acute cystitis was temporarily induced, yet the improvement which immediately followed the previous injections, and which remained even after the acute symptoms had passed away, spoke strongly in their favour.

I am enabled through the kindness of Dr. Alexander to give some further particulars concerning this patient. Nearly two years after I last saw her she was admitted, suffering from her old symptoms, into the Workhouse infirmary under that gentleman, who, hearing that I had been interested in the case, communicated with me, and I saw her again. Dr. Alexander had decided to dilate the urethra and examine the bladder with the finger. This dilatation was effected, and a number of rough projections could be felt, one of which, larger than the rest, was surrounded by the snare of the ecraseur, and removed in my presence. Incontinence only lasted for two days, and, under the employment of astringent injections, improvement continued for some time. Again, however, the old troubles returned; then a second time (October, 1877) Dr. Alexander dilated the urethra and removed with the nail all the rough mucous membrane that he could find. The urine became clear in about a fortnight, but again becoming turbid at the end of a month, nitrate of silver injections, gradually increased up to 10 grs. to the ounce, were employed for a long time with benefit, the patient being able, while using them, once more to resume her duties as a cook.

Hæmorrhage, from a villous growth in the bladder, may continue with varying degrees of intensity for a long time, though ultimately proving fatal.

CASE 38.—HÆMORRHAGE, FROM A VILLOUS GROWTH IN THE BLADDER, OF SEVERAL YEARS' DURATION—DEATH.

Thus, on Sept. 28th, 1874, I examined the urine of a gentleman, somewhat beyond the middle age, who was under the care of N. S. Glazebrook, Esq., of West Derby. It was smoky, and, on standing, deposited a sediment which consisted almost entirely of blood corpuscles. There were no clots, no casts of the ureter, and none of the tubuli. Specific gravity, 1·022; urea (by Liebig's test), 20 per 1000; sodium chloride, 6 per 1000; dissolved phosphates in normal quantity (amount not noted).

It was impossible from a consideration of the character of a single specimen of the urine, in the absence of collateral information, to say much that was positive. The following, however, appeared to be fair inferences. 1stly. It was not a result of acute inflammation of the kidney. The absence of casts rendered this all but certain. 2ndly. It did not appear to result from any disease which had largely invaded the structure of the kidney (such as cancer), as the functional activity of the organ, shown by the analysis of the urine, was unimpaired. 3rdly. It was not the result of chronic inflammation of the bladder, as there was neither tenacious mucus nor a precipitate of phosphates. It might have been from the pelvis of the kidney, and be due to the irritation of a calculus; or from an ulceration of the bladder. These were the two alternatives which I gave, stating, however, that the absence of any trace of uric or oxalic acid was some slight evidence against the former.

The patient went to London, and subsequently to Paris and Germany, for advice, ultimately, however, returning to West Derby, where he died on Dec. 30th, 1874. I had an opportunity of making another examination of the urine, when there was no longer any doubt, from its character, that the source of hæmorrhage was the bladder, and that its cause was a villous tumour.

A post-mortem examination showed an extensive villous growth in this organ, surrounding the entrance of the right ureter, which, with the pelvis of the kidney, was dilated. Microscopically it had the characters of a papilloma rather than that of epithelioma.

CASE 39.—HÆMORRHAGE PROBABLY FROM RENAL CALCULUS. SUBSEQUENT CYSTITIS. RECOVERY.

R. H., Esq., a young, healthy-looking gentleman, of dark complexion, consulted me on Sept. 9th, 1876, under the following circumstances:—A few days previously he had had sudden severe pain in the right loin, and, a short time after the onset of this pain, had noticed that blood was passed *after* he had passed water. Ever since he has been troubled with great frequency of micturition, although there has been no more bleeding. There has been no distinct rigor, nor has he had retraction of the testicle, nausea, altered sensibility along the thighs, or any other symptom indicative of the forcible passage of a calculus along the ureter. There is no pain in the bladder or perinæum after passing water, no pain in the urethra, and no discharge except during micturition. There is a complete absence of œdema. The urine, some of which at my request the patient passed in my presence, was slightly milky in hue, specific gravity 1·010, acid, and after remaining at rest for a short time, separated into a flour-like layer, which was precipitated (and which, on microscopic examination, proved to be pus unmingled with any other deposit), and a supernatant fluid of a pale opalescent tint.

There was no doubt that the case was one of pyelitis, set up probably by the presence of a calculus in the pelvis of the right kidney, and that this calculus had not been forced into the ureter. Every other affection but pyelitis was excluded by the symptoms. The absence of any discharge from the urethra (which was carefully examined), of pain or scalding during micturition, or of bleeding before the flow of urine commenced, shut out the parts anterior to the bladder. The absence of pain after micturition, the acidity and purely purulent character of the urine, and the freedom from mucus, excluded the bladder. The absence of pain along the course of the ureter, of nausea, of retraction of the testicle, of altered sensibility in the cutaneous, &c., nerves of the thigh, excluded the ureter. The absence of any trace of œdema, or of any casts of the tubuli uriniferi, excluded the parenchyma of the kidney. While the distinct history of severe lumbar pain, of bloody urine followed by that having the characters which I have described, and of very frequent micturition, left very little room for doubt that a mechanical irritation had set up pyelitis.

Absolute rest was enjoined, and as well a light, non-stimulating, mainly milk diet; liniment of belladonna to the right lumbar region; and an eighth part of the following mixture three times daily, viz.:—Bromide of potassium and bicarbonate of potash, of each two drachms; tincture of belladonna, m. 80; aq. ad 8 oz. In a few days he was so well that he ventured, on his own responsibility, to take a walk, the effect of which was not only to bring back his old symptoms but others indicative of cystitis. Thus, on the 15th, after the walk on the preceding evening, the urine became turbid, very bloody and charged with mucus, which gave it a gelatinous consistency It had to be voided frequently as its retention now gave pain During the evening of the 14th he had had to rise four times The symptoms were now more those of cystitis. Again perfect rest in the recumbent position was enjoined; a warm bath every night, and after the bath a morphia suppository. Internally tincture of belladonna and bromide of potassium, with tincture of the sesquichloride of iron, were administered, and persevered with until the 28th, when, as all the symptoms had been subdued for some time, I ceased attending.

The necessity and advantage of absolute rest for some time after the subsidence of renal hæmorrhage are shown by the above case.

CASE 40.—HÆMORRHAGE, PROBABLY FROM RENAL CALCULUS.

Arthur Carney, aged 50, a fairly healthy-looking man, was admitted under my care into the Royal Southern Hospital on June 6th, 1877. He said that he had always been well up to March last, when he was suddenly seized with very severe pain in the right loin, which made him faint. On reaching home after recovering from his faint, he found that he had passed a good deal of very bloody urine into his trousers. He rested in bed for a few days. The pain and bleeding ceased, and he continued well till a week ago, when he was again seized with pain, commencing in the right loin and extending round to the front, and followed by the discharge of bloody urine. The bladder became very irritable; but he had no retraction of the testicle, vomiting, or numbness or other abnormal sensation along the thigh.

On admission he complained of a constant desire to pass water, only a few drops being voided at a time, and that with pain. This urine was bloody (the blood being uniformly diffused through the urine), faintly alkaline, specific gravity, 1·012, Great pain was complained of when deep pressure was made just below the ribs outside the right lumbar muscles, and there seemed to be slight bulging here as he sat up. Bowels confined. He was ordered rest in bed; milk diet; from ¼ to ½ gr. of ext. belladonnæ ter in die; and from 10 to 20 minims of chloroform to be inhaled if pain should recur.

There were two or three sharp attacks of pain during the first week, after which all the symptoms passed off, the urine became quite natural, and the patient apparently well, so that he was dismissed on July 7th.

A careful sounding of the bladder after his last attack of pain failed to detect a stone.. Whether this will descend and be capable of removal by surgical means time alone will show.

It is probable that sometimes hæmaturia will occur as the expression of a hæmorrhagic condition, and independently of any particular disease such as purpura. The bleeding under such circumstances may come at one time from the nose, at another from the stomach, at another from the bowel, and so on, its selection of one or the other part being probably determined by temporary and local conditions, Such a case was the following:—

CASE 41.—HÆMATURIA FOLLOWING EPISTAXIS AND HÆMATEMESIS. RECOVERY.

Eliza Shaen, aged 34, was admitted under my care into the Royal Southern Hospital on Nov, 30th, 1874. She was very pale and looked weak, She had a bronchocele, but it was not large, and did not pulsate, She said that two years previously she had had a very severe epistaxis, and that a short time since she had vomited blood. Last Friday, *i.e.* four days before admission, she felt very severe pain over the region of the left kidney, and shortly afterwards passed a great deal of blood with the urine, and the bleeding has continued ever since. The urine passed soon after her admission contained a great deal of blood uniformly mixed with it. She was very restless, unable to sleep, and complained of much general pain. Pulse 100, small.

She was ordered 5 grains of gallic acid and 7½ minims of diluted sulphuric acid in infusion of roses every hour for the first twelve hours, and then gradually at longer intervals; and a grain of extract of opium at night. All her food was to be taken cool. The bleeding quickly ceased and did not return, though the urine was albuminous for some days after the blood had disappeared. Thus, on Dec. 5th it contained albumen, but no blood; specific gravity, 1·015. On the 8th of December, as bleeding had ceased for several days and she was exceedingly pale, the tincture of the sesquichloride of iron in infusion of calumba was substituted for her previous mixture. On the 9th the urine no longer contained albumen; it was acid, specific gravity 1·014, and passed in considerable quantity. From this date it continued natural. She gradually improved in strength, and left apparently well on the 2nd of January.

There was nothing in this case pointing to carcinoma, calculus, or any of the other ordinary causes of hæmaturia, and as she had had bleeding from the nose and stomach previously, without having nasal polypus, or ulcer of the stomach, or cirrhosis, or any other assignable cause, it was more than likely that the renal hæmorrhage (for there could not be a doubt that the blood came from the kidney) corresponded with them. Why the bleeding took place on this occasion from the kidney was not clear.

Case 42.—Hæmaturia probably from Cancer of the Kidney. Temporary Relief.

John Doran, a ship-scraper, aged 34, was admitted under my care into the Royal Southern Hospital on July 2nd, 1872. He gave the following history:—He had always been well up to a year before admission, when, for the first time, he passed blood in his urine. The blood gradually disappeared, but returned five weeks ago, and has been passed every day since. He has a very cachectic appearance. On examination a tumour is detected in the left hypochondrium, projecting six inches vertically below the lower margin of the ribs. Its inner edge is not distinctly detectable, but appears to be four inches outside the umbilicus; the others are obviously rounded. It is movable by palpation, and descends nearly one inch at inspiration. It is superficial. The girth of the right side of the abdomen is 16 inches; that of the left, over the tumour, 17¼. There is a second tumour, about the size of a walnut, situated near the umbilicus. This is somewhat soft, and is not movable either by palpation or respiration. It has been observed for twelve months. Other organs normal. He can retain the urine for four or five hours during the day, but for a shorter time only during the night, without pain. He has, therefore, to get up once or twice every night to micturate. The urine is of a very deep brownish black colour, acid, free from clots, and there is no pain or difficulty before, during, or after micturition. At first gallic acid in 10 gr. doses three times daily; and after a week, during which there was no change in the character of the urine, half-drachm doses of tinct. ferri sesquichlor.; and still later alum and diluted sulphuric acid were administered. Still the blood continued in nearly as large an amount as at first. The daily quantity of urine passed ranged from 60 to 100 oz. and its specific gravity from 1·006 to 1·010. On the 15th he was able for the first time to retain it all night. On the 20th, as the amount of blood seemed unaffected, 20 minim doses of tincture of ergot were given in decoction of pareira three times daily. The blood soon began to diminish, and on the 28th the urine was quite free from it, though pus was still present. There had for some time been pus, causing a deposit 1½ in. deep in a filled 4-oz. urine glass. This also was now much diminished in quantity, and by degrees almost entirely disappeared. He left the hospital very much improved in strength on Aug. 10th, no further trace of blood having appeared.

The hæmaturia lasted in this case altogether nearly nine weeks, viz., five weeks before and twenty-six days after admission. The diagnosis was hæmaturia from carcinoma of the kidney. I was somewhat doubtful, however, whether the tumour that was felt was splenic or renal. If the latter, it was very superficial. Though if the kidney attains a large size, it will of course come to the surface, and may even fill a great part of the abdomen.

The ergot appeared to have the most decided influence on the hæmorrhage of any of the remedies employed.

CASE 43.—HÆMORRHAGE PROBABLY FROM CANCER OF THE KIDNEY. DIABETES MELLITUS.

On June 14th, 1877, I saw, in consultation with N. S. Glazebrook, Esq., Mr. B., a gentleman aged 74, residing at

West Derby. He had always been well till the previous January, when he suffered from swelling and pain in most of the large joints, and some time afterwards with pain in the region of the liver. About the same time some blood first made its appearance in the urine. The two fluids were generally uniformly mixed, but, sometimes, a large coagulum would separate and block up the urethra. For days together the urine would be quite clear and of a natural colour. On the day of my visit, for example, it was quite clear, acid, specific gravity 1·034, contained a faint trace of albumen, but abundance of sugar; urea 1·5 per cent. I did not estimate the quantity of sugar; but the amount of deposited cuprous oxide was so considerable on boiling in the test tube with Fehling's solution, the reaction with nitrate of bismuth, nitrate of silver, and liquor potassæ so very marked, and the amount of evolved CO_2 so great on fermenting a small quantity, that the proportion must have been large.

A hard nodulated painful tumour was felt on the right side of the abdomen projecting beneath the margin of the right lobe of the liver. It rose and fell distinctly with respiration. Manipulation was so painful that its exact definition could not be made out, but it appeared to project from the loins. On the opposite side there was nothing abnormal.

On the 15th the urine had a specific gravity of 1·037, and contained no blood.

On the 17th, however, it contained a very large quantity of blood, but no clots. It was faintly acid, specific gravity 1·022, showed neither crystals nor casts when examined microscopically, gave 2·55 per cent. of urea, and decided indications of sugar.

I saw the patient on the day but one afterwards, the hæmorrhage continuing, and found the tumour markedly diminished in size, though still painful to deep pressure.

The bowels were regulated by the compound colocynth and hyoscyamus pill, and large doses of the liquid extract of ergot given internally to control hæmorrhage.

We felt that we could not hope to do more than mitigate suffering and the patient sank exhausted after a few weeks.

Unfortunately, I was prevented, by pressure of work, at the time, from making an estimate of the quantity of sugar in this urine; but for the reasons given it must have been considerable. This is the only one, among a large number of cases of saccharine diabetes that have come under my observation, where hæmaturia, apparently from cancer of the kidney, was associated with that affection. Whether the diminished size of the tumour resulted from the copious hæmorrhage that had taken place must be a matter of conjecture, as no post-mortem examination was made.

In the following case the cancer of the kidney was attended by ascites and œdema of the lower extremities, owing to pressure of the enlarged organ on the vena cava, &c., and it was not until the abdominal dropsy had been relieved by paracentesis, that the enlargement could be detected.

CASE 44.—ASCITES. ŒDEMA OF LOWER LIMBS. SLIGHT HÆMATURIA CANCER OF RIGHT KIDNEY.

Mary A. Warhurst, aged about 35, was admitted into the Hospital, April 27, 1871, suffering from abdominal dropsy. In addition to the ascites, which was very great—the abdominal walls being tightly distended and respiration interfered with—there was much œdema of the feet and legs. The patient was pale and thin, but did not look markedly cachectic. It was impossible to make a proper examination of the abdominal viscera until the fluid had been evacuated. Paracentesis was performed by Dr. Nottingham, when a large tumour was discovered deep in the right lumbar and inguinal regions, irregularly rounded in outline, only slightly movable during respiration, but with a narrow though clear interspace between its lower edge and the pelvis, in which interspace the finger could be pressed back to the spine. This latter circumstance conclusively proved that the tumour was not ovarian, and indeed that it could not have had a pelvic origin. The urine was highly albuminous, but did not at that time contain blood, though it was probable from the account given that hæmaturia *had* existed. I concluded that the tumour was renal and probably cancerous. The patient lingered till June 11th. *Post-mortem.*—The right kidney was found to be enormously enlarged and to be the subject of soft cancer.

Death in the above case was from exhaustion.

It sometimes, however, results directly from hæmorrhage. This was the case with a patient who was transferred to me, at the close of the year 1870, by Dr. Wollaston, under whose surgical care he had been admitted into the Southern Hospital.

The patient had been the subject of recurring attacks of hæmaturia, which were at first thought to be vesical and due to calculus. The history of the case and examination having negatived this view, he was transferred to me. On my first seeing him he was much exhausted from repeated hæmorrhage. Rest, cold drinks, cold to the loins and abdomen, with the internal administration of astringents, caused a temporary cessation of the bleeding. A few days later, however, he passed a very large amount of almost pure blood by the urethra, and in a few minutes died. *Post-mortem.*—The bladder was found full of blood, the right kidney large, irregular, and the subject of soft cancer, in the progress of which a communication had apparently been established between the vena cava descendens and the ureter, through which the last copious and fatal hæmorrhage had taken place. The morbid specimen was exhibited, and the case commented on at the succeeding meeting of the Liverpool Medical Institution.

CASE. 45.—CANCER OF KIDNEY. HÆMATURIA.

The following case was attended by myself in consultation with Mr. George Walker, F.R.C.S., of this town. The patient was a child of two years of age, in whom had been observed for many months a slowly progressing tumour, which pushed forward the lower right ribs, filled the right lumbar space, and projected the abdominal walls as far as to the left of the umbilicus. In a downward direction it almost reached the brim of the pelvis. It retained the general shape of the kidney in a remarkable manner. The skin over it was nowhere œdematous. Manipulation gave no pain; and it presented a distinct fluctuation. In the opinion of the nurse and parents, its size was markedly less at one time than another, but they were unable to associate the diminution with any increase in the quantity of urine discharged. The child did not present marked emaciation, except of the lower limbs. At times he was able to be up and about, and appeared then quite cheerful. For a few days previously to our seeing him together, however, he had failed very much. I had examined the urine on several occasions, and it threw no light on the case. It had never contained blood, and the most abnormal feature which ever characterised it was the presence occasionally of a few pus cells. A careful examination failed to detect any glandular enlargement, or change in any of the other organs. What was the nature of this tumour? The evidence was very conflicting. Of one thing, however, there could be no doubt, and that was that it contained a large quantity of fluid. We represented, therefore, to the parents the difficulty that we had in feeling absolutely certain as to the exact nature of the enlargement, but advised that they should allow of the introduction of an aspirating needle, and the withdrawal of some of the fluid. This they did. The trocar was passed into the tumour, in the interior of which it moved freely as in a large sac, and several ounces of a very deeply blood-stained fluid were drawn off, which, on being allowed to stand for a time, separated into a dense coagulum and a reddish liquid portion. I examined some of this liquid, and found it to contain ·5 per cent. of urea.

A week later bloody urine was passed for the first time, and ultimately, after some weeks, the child sank.

The difficulty in deciding between carcinoma and hydronephrosis was considerable in the above case. There had never been hæmaturia; the nurse and mother felt no doubt that the tumour varied greatly in size at different times, and it distinctly fluctuated. Yet the character of the fluid that was withdrawn by the aspirator, and the hæmaturia that occurred later on, could leave no doubt as to the cancerous nature of the growth.

The above cases are merely illustrative of the chief causes of hæmaturia. As a symptom this may occur in a great variety of local and general diseases, such for example as acute nephritis, tubercular disease of the kidney, &c., on the one hand (of which illustrations are given elsewhere); or purpura, variola, &c., on the other. In the hæmaturia attending purpura I have found small doses of spirits of turpentine, 5 to 10 m., sometimes check the hæmorrhage after other astringents have failed. After what has been said on each case, special remarks on treatment are needless.

CHAPTER X.

CASES IN WHICH LARGE QUANTITIES OF PUS FORMED A MARKED CLINICAL FEATURE.

Pus, like blood, may appear in the urine from many causes, and from different portions of the urinary apparatus. In the present chapter I propose merely to give a few cases where the purulent urine has been the result of simple pyelitis or cystitis, or of tubercular or scrofulous inflammation, as not a few examples of purulent urine; and mixed cases in which pyelitis was associated with other renal or vesical disorders, have already been given under the heads of hæmaturia and chronic dropsy from renal disease.

CASE 46.—PYELITIS. VERY PURULENT URINE: CURE.

A more marked example of purulent urine from pyelitis than I have ever seen before or since, was presented by a case about which I was consulted by Dr. S. A. Lucas, in December, 1876. The patient, a young man aged 26, had some time previously, as the result he thought of cold, been seized with lumbar pains, recurring rigors, and some slight feverishness. Following these symptoms he observed his urine to throw down a white deposit, which gradually increased, until the entire secretion became very thick and exactly like pus. He did not remember to have seen blood in the urine, and had had no dropsy. He felt weak, and unable to work.

This urine had the appearance of pure pus. It was thick like cream, of a yellowish colour, and did not separate into layers even after standing for several hours. It was acid, had a specific gravity of 1·033, and contained 1·3 per cent. of urea. We agreed to keep the patient absolutely at rest, apply counter irritation to the loins in the shape of sinapisms, maintain the action of the skin by warmth, and to administer large doses of tincture of the sesquichloride of iron. I examined the urine again on the 7th of February, 1877, when it had all the characters of a healthy secretion. It was of a light amber colour; perfectly clear; free from deposit; acid; and had a specific gravity of 1·002, There was a very remarkable difference in the amounts of the total solids and ash on the two occasions. Five c.c.s of the urine were taken on each occasion, evaporated carefully in a platinum capsule, dried at 200° F., till weight ceased to be lost, weighed, then incinerated and finally weighed again, with the following result:—In the first specimen the total solids in the 5 c.c.s equalled ·435 gramme, of which ·385 gramme was organic, and ·050 inorganic, or a proportion of inorganic to organic of 1; 7·7; while in the second there was but ·191 gramme of total solids, of which ·145 gramme consisted of organic, and ·046 of inorganic material, or a ratio of inorganic to organic of 1 : 3·15. The amount of ash on the two occasions was nearly the same, the difference being only that between 50 and 46 centigrammes in the 5 c.c.s. The great difference in the total solids was, therefore, probably entirely due to the large amount of pus in the first, and its total absence from the second specimen.

The concurrence of lumbar pain, rigors, and highly purulent acid urine, without dropsy, left no doubt as to the nature of this affection, and the persevering employment of the tincture of the sesquichloride of iron in large doses, with the other treatment, was soon followed by cure.

Not unfrequently, as in the following examples, there is a good deal of blood in the course of pyelitis, either directly from the pelvis of the kidney, or secondarily from the mucous membrane of the bladder.

CASE 47.—PYELITIS, HÆMATURIA, CURE.

Mary Jennings, a widow, aged 39, was admitted into the Royal Southern Hospital under my care on January 9th, 1877, She was a fairly healthy-looking woman. Her illness had commenced 7 or 8 months previously with a rigor, accompanied by lumbar pains, which increased in severity for several months. She did not notice any blood in the urine till about three months ago. Has never had swelling of the face or legs. Has never had scarlatina. Has not menstruated for six months, but before that time was quite regular, She knows no cause for her illness.

A careful examination failed to detect any enlargement of either kidney. There was no tenderness over the bladder when examined externally, or per rectum or vaginam. She is obliged to micturate very frequently, and whenever she does so she suffers a burning pain, which continues for a short time after the urine has passed. The urine is never suddenly stopped, except occasionally for a moment by a small clot of blood. When first seen it was red from blood, was very alkaline and contained thick ropy mucus—the result probably of the alkaline reaction on the pus. There was no chalk-like or crystalline matter. She was ordered the following draught four times daily:—Acid nitric dil. m. x; ext. ergotæ liq. m. xx; aq. ad. 1 oz.; and to drink copiously of water.

On the 13th there was no mucus, though blood was still present.

On the 15th there was no blood in the urine. She still complained of much lumbar pain; to relieve which a belladonna plaster was applied, and her mixture changed to the following: —Tinct. ferri sesquichloridi m. xv.; t. hyoscyami m. xxv.; glycerini m. xxx.; aq. ad 1 oz.; ter in die sumendus; and a few days later, in consequence of a return of the tenacious mucus and alkalinity, in addition to the above a draught containing diluted nitric acid in the decoction of pareira twice a day. Gradually the urine improved in character till, on the 9th of February, she was reported to have no more trouble with it, and as she continued to feel well and desired to go out she was discharged on the 12th, after rather more than a month's residence in the hospital, the same treatment having been continued up to that time.

Case 48.—Pyelitis. Hæmaturia. Relief.

William Fleming, a sailor, aged 52, a pale somewhat cachectic-looking man, was admitted under my care into the Royal Southern Hospital on November 3rd, 1877, suffering from subacute rheumatism. He had been ill for five weeks, with pain and swelling of the principal joints, and some amount of fever. The temperature on his admission was 100° F. in the axilla. Pulse 104. The ankles, knees, and right wrist were somewhat swollen and painful. He further stated that three weeks before admission he began for the first time to pass water much more frequently, and as he thought in larger quantity, than usual, and that the urine was of a dark colour, as if from an admixture with blood. A week later about half an ounce of pure blood was passed at the end of micturition, but unaccompanied by any pain. At present, in addition to his rheumatism, he complains of excessive frequency of micturition both by day and night, though oftener by night than day, without pain, either in penis, perinœum, or thighs. He has no retraction of testis. There are shiverings almost every day. Entire absence of œdema. The evacuation of the bowels is said to be accompanied by pain at the end of the penis. On rectal examination the prostate is found to be enlarged and somewhat tender. There is no discharge from the urethra.

The urine first passed was examined and found to contain a considerable quantity of pus, as well as a small proportion of blood uniformly diffused through it, but no pelvic epithelium. Reaction acid. No casts.

Ten grains of salicylic acid in an ounce of water every three hours. Joints to be wrapped in cotton-wool, and the following draught each night at bed time: pot. bromidi, gr. 30; tinct. hyoscyami, m. 40; water one ounce. His rheumatism was soon relieved, but not much effect was produced either on the character of the urine, or on the frequency of micturition. There was a slight amelioration in the latter symptom, however. On the 5th, as the joint pains were relieved, the following mixture was substituted for the salicylic acid: Pot. bicarb. two drachms; tinct. hyoscyami, four drachms; water to eight ounces. An eighth part three times a day. Three days later he was passing 26 oz. of very purulent urine between 8 p.m. and 8 a.m., at 12 different micturitions. The bladder, therefore, could now retain about two ounces at a time—a decided improvement. The urine continued acid, and contained no more albumen than could be accounted for by the pus. On the 18th the decoction of pareira was substituted for water in his mixture, and a morphia suppository introduced into the rectum night and morning. The frequency of micturition was somewhat lessened by these means, as he was only up nine times from 7 p.m. to 7 a.m., and five times between the latter hour and 4 p.m. He could thus retain the urine nearly two hours, instead of having to void it every hour, as he had to do a fortnight previously. On Nov. 30th the belladonna was increased to 40 minims night and morning, and at the same time a drachm of tincture of hyoscyamus and a drachm and a half of the liquid extract of pareira in an ounce of water, given three times daily, instead of his former mixture. By Dec. 4th the number of micturitions had fallen to 3 in the night and 6 in the day, though at the same time the amount of urine secreted had become reduced to 18 oz. He complained of a feverishness every day at about noon, which was always succeeded by a feeling of illness. In hopes of relieving this, tincture of quinine was prescribed with the belladonna. During the remainder of his stay in the hospital the quantity of urine passed varied from 18 to 22 oz. daily (*i.e.*, in the 24 hours), and he usually micturated four times by day and four times by night. The amount passed during the night was almost invariably considerably greater than that of the day, being often twice and sometimes even three times as much, while there was no greater frequency of micturition. The bladder would contain 8 oz. for many days before the patient left, which he did by his own wish on the last day of the year, after having been up and walking about for nearly a fortnight.

The urine was still purulent. Whether by prolonged treatment further amelioration would have followed, is of course conjectural. I believed that it would, and was much disappointed by the patient's determination to leave. The cause of the pyelitis was not very plain. It probably, however, was by extension of inflammation from the bladder, as the patient's account of passing a quantity of pure blood at the end of micturition, early in his illness, was very explicit. There was no cystitis, either acute or chronic, however, when he came in, for he invariably said that he did not suffer pain, a circumstance which would have been inconsistent with the existence of the first affection; and the urine remained acid and free from stringy mucus to the last, one equally inconsistent with the second. The prostate was large, indurated and somewhat tender, but the absence of all pain after micturition excluded the idea of its being inflamed.

Cases where purulent urine is the result of the involvement of the kidney and bladder in a more general tuberculous disease are happily very rare, as they are invariably fatal. The occurrence of tubercle in the kidneys is probably without exception associated with a similar pathological condition in the lungs, and death is frequently much hastened by the exhaustion consequent on the rapid development of pulmonary symptoms. These symptoms may, however, for a long time be latent, while those arising from the diseased condition of the kidneys and bladder are active, just as cough is often in abeyance during the diarrhœa arising from tubercular ulceration of the intestines, even though there is extensive mischief in the lungs.

Case 49.—Tuberculous Ulceration of Right Kidney and Bladder. Pulmonary Phthisis. Death.

Charlotte Rustidge, aged 20, was first admitted into the surgical wards of the Royal Southern Hospital, under Dr. Wollaston, in the latter part of 1876, suffering from vesical irritation. The urine was bloody, and subsequently very purulent, and the symptoms were of such a character as to lead to a careful sounding of the bladder, with, however, a purely negative result. She improved under Dr. Wollaston's care, and left the hospital, but was again admitted under the same gentleman on Nov. 30th, 1877.

On this second admission she was suffering from very frequent micturition, the urine containing about a third of pus, and not unfrequently blood, the blood and pus being mixed. She complained of lumbar pain, and had profuse night sweats. Nitric acid in decoction of pareira was prescribed, without influencing the character of the urine. This—the urine—was secreted in rather large quantities, sometimes as much as 40 oz. being voided during twelve hours. At this stage there was uniformly a slight rise in the evening temperature, which ranged from 99° to 101° F. The chest symptoms, however, were not at all prominent; being confined to a slight cough and a small amount of muco-purulent sputum. Percussion is said to have given a normal note. She suffered much from want of sleep; for which chloral hydrate, &c., were administered. The bladder was examined several times, but no stone detected. The coats were said to feel rough, and the cavity to be contracted. Rectal and vaginal examination are also noted to have been made, the latter occasioning great pain, but the results being otherwise nil. Slight discharges of pus were said to take place occasionally from the rectum. She had only menstruated two or three times during her life.

I saw her for the first time with Dr. Wollaston, on January 19th, 1878, when, in addition to the above account, which was given to me, I found that she was suffering from temporary diarrhœa and vomiting, which prevented a close examination at that time. Considering the case to be one of tubercular inflammation of the bladder and one or both kidneys, with pulmonary phthisis, it was decided to transfer it to me, though it was then obviously very near a fatal termination. Diluted hydrocyanic acid and bismuth, in an effervescing mixture, relieved the vomiting and diarrhœa, and I then examined the abdomen. There was no tumour, but pain was complained of on pressure being made over the hypogastrium. She was in a very exhausted condition, inclined much to sleep, and coughing a good deal, the sputum being muco-purulent and quite free, as it always had been, from any trace of blood. She lingered in this condition until February 21st, the urine retaining throughout the same characters as at first, but her pain being much relieved by the employment of morphia suppositories. Parrish's syrup was prescribed in drachm doses three times daily when she would take it, with directions, however, not to disturb her from sleep.

On *post-mortem* examination both lungs were found diseased, the apices being the seats of a number of small tubercular cavities. The right kidney only was affected. It was enlarged, though not to so great an extent as it often is. Its surface was irregular from rounded projecting knobs, which were found, on section, to correspond to internal collections of pus and cheesy matter. A great number of such collections and of cavities with thick reddish-white walls from which the contents had been discharged, were found throughout the organ. The right ureter was extensively ulcerated and the bladder small, its walls thickened, and the mucous membrane everywhere eaten into by ragged ulcers, with raised, roughened edges. The left kidney and ureter were healthy. Scattered ulcers were found throughout the lower part of the small intestine.

The late development of the pulmonary symptoms was a noteworthy feature in the above case, and, as well, the rapidly fatal event when this development had taken place. One kidney only being affected, the removal of urinary products from the blood was probably not much interfered with. It seems all but certain that the condition of the urinary organs found after death was essentially the same as gave rise to the symptoms present on her former admission, more than a year previously. This shows the great importance of most scrupulously guarding the subjects of scrofulous inflammation of the kidney or bladder against whatever would be likely to excite active irritation in the tubercle that is almost certainly present at the same time in the lungs.

A very unusual case of scrofulous inflammation was seen by me, with Dr. Hopper, in the winter of 1876. The patient was a young girl about twenty years of age, under the care of that gentleman at the Liverpool Home for Incurables, at which institution, by Dr. Hopper's request, I saw her with him. She was suffering from cough and muco-purulent expectoration, was voiding purulent and bloody urine, and was deeply bronzed over the face and various other portions of the skin. On examining the patient, which, owing to her highly hysterical condition, we could only do very imperfectly, we found a very distinct tumour, rounded at its lower edge, projecting beneath the lower edge of the liver, moving up and down with respiration, and traceable obscurely in the right loin. No enlargement could be detected on the opposite side.

The evidences of advanced pulmonary phthisis were here marked. The bronzing, however, was so much deeper than is usually found in that affection that, from it and the extreme cardiac and general weakness of the girl, we made up our minds that there was tubercular inflammation of the adrenals, and probably similar disease of the right kidney.

The patient sank in the course of a few weeks, when, on *post-mortem* examination, only one kidney—the right—was present. The most careful search could not detect any trace of a second, or of the left ureter. The single kidney was very large. Its general shape was that of the normal kidney, and it had nothing of the horseshoe outline so often found when only one organ is present. It was filled with scrofulous abscesses, and might have served as the specimen from which the most typical of Rayer's drawings of the disease had been made. The supra-renal body was the subject also of typical tuberculous disease, in some parts soft and breaking down with yellowish caseous deposit, in others hard from calcareous matter. The ureter was large, and it and the bladder extensively ulcerated.

In treating cases of pyelitis, or simple cystitis, great relief is obtained by the free employment of opium or morphia, the latter preferably as a rectal suppository, the pain and irritability of the bladder rapidly diminishing, and the amount of urine that can be retained rising from a few drachms to two, three, and four ounces, often in a comparatively short time. Belladonna internally and locally, in the first case in large doses, affords some relief to pain, but cannot be made to take the place of opium. If the urine is offensive and ammoniacal, very great relief is afforded by washing out the bladder once or twice daily, according to the admirable rules laid down by Sir Henry Thompson in the work previously alluded to—for the male a four ounce gum elastic syringe, provided with a stop-cock and a projecting nozzle for insertion into the catheter, being employed, and from one to two ounces being introduced at a time, two or three times successively, of very diluted solutions of acetate of lead, carbolic acid, nitric acid, nitrate of silver, or other astringents or antiseptics. I have seen the greatest possible relief given in this way, especially from the employment of carbolic acid solutions, an example of which is given on p. 220.

Where, in cases of pyelitis or other more general diseases, the urine is voided, or speedily becomes, alkaline, it can soon be rendered acid and quite clear by appropriate diet, though acid medicines would have no effect. In illustration of this I will mention two very recent cases, one that of Harding, to whom reference has previously been made, the other that of Jennings, a man suffering from advanced locomotor ataxy, with much loss of muscular power over the left leg, frequent jerking of the limb, a feeling of abdominal constriction, and other evidence of spinal myelitis, complicating the sclerosis. The urines of both patients were found to be alkaline and turbid, whenever they were examined. The mixed diet which they had been taking was replaced by one almost wholly animal. Cold meat, with only a little piece of thin dry toast, was given for breakfast; meat, without any vegetables, for dinner; and the same again at tea time. Water and tea were allowed for drink. The urines the next day were quite clear and acid, and continued so at the end of twenty-four hours. This favourable change lasted not only so long as the change of diet was persisted in, but even after it had been gradually changed for the previous one of a more mixed character. Of course, such effects are only what would be expected from a consideration of the characters of the natural urines of the carnivora and herbivora respectively, and of the changes that can be wrought in these respectively by giving to members of one group the diet usually taken by those of the other; still I do not think, from what I have seen, that the application of these simple facts to the treatment of disorders of the human urine is quite so frequently borne in mind as it deserves to be.

For fuller particulars on the subject of treatment under various circumstances and complications, such as the use of the bath, &c., &c., I must refer to the particular cases which have been detailed, in which the effects of various remedies are set forth.

CHAPTER XI.

CASES (OTHER THAN THOSE MENTIONED IN CHAPTER X.) IN WHICH INDEPENDENT DISEASE OF THE KIDNEY OCCURRED TOGETHER WITH DISEASE OF SOME OTHER ORGAN IN THE SAME INDIVIDUAL.

NOTHING can be more striking than the difference in the secondary effects which follow acute or chronic disease of the kidney in different cases. Amid a general resemblance due in some forms of the disease to the innutrition of tissues from an impoverished and poisoned blood, there is a special affection, now of one and now of another organ, which, by its intensity and the further disorder which it induces, may give a special character to the course of the disease. This diversity is more marked in adults than children, and in many cases, no doubt, is due to the effect of previous habits in lessening the functional efficiency or even producing structural disease of important viscera, in consequence of which they yield more readily to a cause which affects all alike. Thus, though vomiting is often a late symptom, yet sometimes it occurs early and is very persistent, especially if, previously to the development of the renal disease, the patient has been chronically dyspeptic. Again, ascites may be an early complication, the condition of blood caused by the disease of the kidneys appearing to be just enough to determine the necessary change in a liver not quite structurally sound at the outset. In yet others the most striking and not the least painful affection is that of the skin

—a universal rash appearing, extremely inflammatory in its course, often presenting large patches containing pus, and evidently due to the elimination of an irritating material. Yet again, the main stress may appear to be on the intestinal mucous membrane, which throughout may be so affected as to cause persistent diarrhœa. Or the nervous symptoms generally associated with what is termed uræmia may be most prominent; and convulsion, severe and persistent headache, or a condition of half fatuity, or the alternation of these states, make all other symptoms appear relatively unimportant. Examples of these different secondary effects have been given in the foregoing pages.

But there may be associated with the kidney disease independent organic affections of one or another organ, more particularly of the heart or lungs, whose symptoms may mask some of the more important features of the renal affection.

CASES OF COMBINED KIDNEY AND HEART DISEASE.

That a change, and a very obvious change, is often produced in the kidney as the result of congestions due to chronic valvular diseases, I have already pointed out, as I have also that this change is altogether different from cirrhosis. I am willing to admit that sections of such a kidney—*i.e.*, of the kidney of cardiac disease—when viewed under high powers often present much the appearance which would be presented by corresponding sections from the cirrhosed organ. Yet this apparent similarity in the microscopic structure of the very minute portions of the two organs must not blind us to the fact that the organs themselves when viewed in their entirety, and not judged of merely from such minute microscopic bits, are strikingly dissimilar, that the symptoms are dissimilar, the course dissimilar, and the mode of death dissimilar, and that this dissimilarity is just as striking in very chronic cases, where ample time must be supposed to have existed for the development of the cirrhosed state, if such development were likely to take place, as it is in those that are less prolonged. The kidney of chronic cardiac disease, as I have before remarked, is round and plump and full. It is red. The glomeruli can be easily seen with the naked eye. The structure is hard but not tough, as its capability of resisting physical strain, as well as its specific gravity, is considerably less than that of the healthy or of the cirrhosed organ. But, as I have also previously pointed out, cirrhosis of the kidney is a disease quite compatible with the retention of apparently good health; and so far as I am aware there is nothing in it, more than in any other disorder, antagonistic to the occurrence of valvular affections. Yet if such valvular affections occurred in one who was the subject of cirrhosis, he would be very likely to think that up to the onset of the heart disease he was quite healthy. The relation of the two diseases, when they occur together, is perhaps best indicated by the following quotation:—"I have never, however, witnessed any contraction of a kidney to a size below normal as a consequence of persistent venous congestion; but I have often seen cases of genuine contracted kidney in which the patient, while still under my observation, has had endocarditis affecting the mitral valve and leading to its permanent defectiveness; and from this I am led to think that, in cases of contraction of the kidneys supposed to be due to persistent venous congestion in consequence of heart disease, confusion has arisen regarding the actual sequence of events in point of time."*

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* Bartels in Ziemssen's *Cyclopædia*, vol. xiv., p. 203.

This opinion is, I believe, far nearer the truth than the one which regards the valvular lesion as the cause of cirrhosis. During the last ten years I have carefully examined the kidneys in a very large number of cases of chronic valvular disease, in many of which, from the long duration of the affection, there must have been ample time for the development of the cirrhosed state, if congestion alone could develop it; and yet, with the exception of those to be detailed, and perhaps one or two others, I have never seen the two conditions coincident. If, therefore, the vast majority of cases of valvular disease, however chronic they may be, do not cause cirrhosis of the kidney, one cannot resist the belief that in the few exceptional cases where the two affections have co-existed the co-existence must have been accidental.

The following case can probably be best explained in the manner that I have just suggested, and may illustrate the kind of sequence mentioned in the quotation from Bartels, although in this case the aortic valves were chiefly affected.

CASE 50.—AORTIC VALVULAR DISEASE. RENAL CIRRHOSIS. PERSISTENT VOMITING. DEATH.

Samuel Deane, a porter, aged 60, was admitted under my care into the Royal Southern Hospital on Sept. 8th, 1875. He gave the following history:—On the whole he had had fairly good health, the only illness that he remembers being a vomiting of blood in large quantity sixteen years ago, the vomiting being difficult to stop at the time; and an attack of rheumatism several years later. It was not clear from his account whether this attack was acute. He had been able to work as usual up to two months ago, when he was compelled to desist, owing to want of breath, dropsy, and vomiting.

He was thin, and looked ill. His face, though not pale, was pinched, and had a dragged, anxious, pained expression. The arcus senilis was very distinct. He complained chiefly of dyspnœa, vomiting, and abdominal pain. Œdema was confined to the lower extremities. The lungs were normal. The heart was greatly enlarged, the apex beat being outside the line of and two inches below the left nipple. There was a loud systolic bruit, heard with maximum intensity at the base, to the right of the upper extremity of the sternum. Pulse 88, regular. Superficial arteries rigid from calcification. Careful examination of the abdomen failed to detect any tumour. The abdominal pain was not increased by pressure. Bowels confined. Twelve oz. of urine were passed during the first twelve hours, with the following characters, viz.:—Acid, pale, specific gravity 1·012, highly albuminous. Temperature 98·6° F.

The bowels were relieved by a dose of compound jalap powder, and then small quantities of milk and lime-water ordered, and a dose of effervescing mixture given every four hours. The vomiting continuing, 13 m. doses of spirits of chloroform were substituted on the 11th, Still the vomiting continued. All food and medicine were therefore withdrawn from the mouth on the 15th, and nutrient enemata administered four times daily, the first of these having 15 m. of tinct. opii mixed with it. He strained very much on the introduction of the enemata, and was said to spit some bright-coloured blood after each; but it was not quite clear whether this blood had been coughed or vomited.

On the 14th he was very low and seemed to be in danger of sinking. The vomiting, which had been temporarily diminished, returned with much intensity. A third of a grain of morphia was now ordered three times daily, in a small pill. This acted in the most marvellous manner. The vomiting became at once diminished, and during the day entirely ceased. Pain disappeared, and he seemed brought back suddenly from death to life. The urine was now secreted in larger quantities, and the albumen almost disappeared. Twenty oz. were voided during the night of the 14th. The improvement continued till the 18th (four days). During this time he was able to take and retain on the stomach small quantities of beef-tea and milk and lime-water. For the four nights he slept well also—a most unusual circumstance. On the 18th, however, the vomiting returned, the matter rejected having the appearance of coffee-grounds. The urine passed on this day was clear, had a specific gravity of 1·023, and but a faint trace of albumen. It was noted that the addition of the nitric acid was not followed by an increased depth of colour. On the following day diarrhœa occurred, accompanied by much painful tenesmus and the frequent vomiting of a green fluid. Temporary relief followed the employment of an opiate enema, which controlled the tenesmus; while the diarrhœa was diminished and the vomiting checked by it and by the following powders, one of which was given three times a day:—Trisnitrate of bismuth, gr. 5; mag. carb. gr. 2; pulv. acaciæ, gr. 3; morphiæ hydrochlorat. gr. $\frac{1}{3}$. On the 22nd the bowels acted twice. He had not vomited, but was very prostrate and the feet were quite cold. He was perfectly clear in mind, and at once responded to questions, though in a faint voice. No urine was passed during the day and night of the 23rd, nor was there any in the bladder. Small quantities of brandy and port wine were administered, sinapisms were applied to the loins, and warmth to the legs and feet. Again he seemed to rally, and urine was passed. Nutrient enemata were introduced four times daily, and only a little iced water with a few drops of brandy in each dose, or a little soda-water, given by the mouth. Thus he went on until the 26th, when vomiting again recurred and proved completely uncontrollable. The vomited matter was a greenish fluid. It was forcibly ejected, and was quite independent of the administration of fluids by the mouth—one of the features of uræmic vomiting. He grew weaker, and died exhausted on the morning of Sept. 30th, having had no coma or convulsions, or any other uræmic symptom than the vomiting throughout.

The *post-mortem* record is not so complete as it should be, but contains the following :—Heart hypertrophied ; weight 21 oz. Aortic valves studded with calcareous spicules, one of which, passing horizontally from the aorta externally to the centre of one of the valves internally, seems to keep this permanently open. Aorta much dilated and paved with calcareous and atheromatous plates. Radials rigid from similar deposits. The kidneys together weighed 6½ oz. They were of a mahogany red colour, and were extremely irregular from abundant granulation. On section the cortex was found to be very deficient, and running tortuously through it and the medullary portion were a number of white lines. Their sections, viewed under a ⅛-inch objective, showed the glomeruli wasted, and surrounded by a thick—in some instances a very thick—investment made up of many layers of wavy fibrous tissue, many of the convoluted tubules contracted almost to obliteration, and the smaller arteries enormously thickened.

The obstruction to the blood flow, caused by the contracted calibre of the smaller actions resulting from the condition of the kidney, concurred with the obstruction of the aortic orifice in bringing about cardiac hypertrophy in this case. The quantity of urine was very small, and this might have been due to the blood pressure within the kidney being much less than what it is generally in this affection, owing to the obstruction at the aortic orifice.

The administration of morphia, even in small doses, is certainly not generally advisable in renal atrophy, and was only resorted to here after great hesitation, and after many other means employed to arrest the vomiting had failed, and the patient seemed in danger of sinking. Its effect in immediately arresting the vomiting and producing some days of quiet was, however, very striking. This case seems to give colour to an opinion which I have previously expressed, viz.:—that where vomiting is constant and excessive the nervous symptoms of uræmia are frequently not manifested. I regret that no analysis was made of the vomited fluid, but I have scarcely any doubt that they would have been found to contain urea, as did those in the case of Jane Case (vide p. 137).

A somewhat similar relation between the condition of heart and kidney probably existed in the following case :—

CASE 51.—AORTIC OBSTRUCTION. ALBUMINURIA. DROPSY. PERSISTENT DIARRHŒA. IMPROVEMENT.

Henry Moorhouse, a labourer, aged 26, was admitted into the Royal Southern Hospital on June 4th, 1875. He was a stoutly-built young man, with a very pale clear skin and bright dark eyes and dark hair. He was suffering from œdema of the feet, legs, thighs, and scrotum, which he first observed fourteen weeks ago. For a long time previously to this he had remarked that he made water more frequently than heretofore, having to get up several times every night for the purpose. During the winter he had been exposed very much to cold and wet, and, with a view as he thought of preventing the ill effects of these, had drunk very largely of beer, taking often from 6 to 10 pints during the day. The urine that was first passed after his admission was of a deep colour, acid, had a specific gravity of 1·012, and threw down a large quantity of albumen on the addition of heat and nitric acid. The radial pulse was hard, full, and resisting: 76 beats in the minute. The heart was much enlarged, the impulse being carried considerably downwards and outwards. It was most visible and most clearly distinguished by touch at a spot exactly four inches vertically beneath the left nipple. Its impulse was powerful. No bruit was heard at the apex though the sounds were not perfectly clear, but at the base an obstructive aortic sound was audible. It was heard only at the systole, and most distinctly at the junction of the second left costal cartilage with the sternum. Shortly before Christmas he says that he was suddenly seized with a violent bleeding at the nose, which could not be stopped until the nostrils were plugged. He has never felt so well since this. The epistaxis was not preceded by headache—indeed he said that he had never had headache in his life. There was a good deal of dyspnœa, and the respirations in the recumbent position were 30 in the minute. The respiratory sounds were very feeble all over the left side of the chest, and at the base anteriorly became inaudible. Posteriorly bronchial râles were heard. He had had rheumatic fever three times; the first time when he was sixteen years old, the last time two years ago. He considered that he had recovered perfectly from these attacks.

He was ordered a strictly milk and farinaceous diet. Misturæ ammoniæ acetatis ℥j, quater in die; and a hot air bath every night.

The progress of this case was interesting in several respects. The perspiration induced by the baths was very profuse; the bowels were loose, acting sometimes three or four times daily; yet the quantity of urine voided daily ranged from 60 to 100 oz. for many weeks. No attempt was made to check either perspiration or purgation, unless the last became excessive; indeed whenever, as on the 12th, the bowels were in the least degree inactive, a pill containing gr. ¼ of podophylline, with 5 of pil. coloc. et hyoscyami was given, with the effect of producing several free evacuations and affording relief. On the 16th there was still a good deal of œdema of the face, notwithstanding the daily copious discharges. As there had been on the whole but little change in the general symptoms by the 20th, he on that day was ordered 15 m. of the tincture of the sesquichloride of iron three times daily. On the following day he suffered from severe pain in the head, the heart's action was unusually powerful, the carotids throbbing, and the radial pulse full and resisting. The face, too, appeared more swollen, and the lips thick and congested; while the bowels were not acting so freely. The iron mixture was at once omitted, the milk diet resumed, and an effervescing mixture in which the carbonates of ammonia and magnesia were neutralized by citric acid, was substituted, while in addition sinapisms were applied to the nape of the neck and a podophylline pill again given. Four of the mustard plasters were applied without producing any redness of skin. The change of treatment was at once followed by a relief to his distressing symptoms, the bowels beginning to act, the headache entirely disappearing, and the face resuming its usual cheerful aspect. The treatment was henceforward steadily persisted in until July 7th, when, as the purgation seemed to be extreme and producing debility—the bowels acting very frequently through the day and sometimes five times during the night also—the mixture was temporarily omitted and astringents substituted. It is worth while remarking that a combination of trisnitrate of bismuth and sulphate of copper—5 grains of the former and $\frac{1}{4}$ gr. of the latter—produced no apparent effect on the bowels, while the mistura hæmatoxyli of the Guy's Hospital Pharmacopœia instantly moderated the diarrhœa in a satisfactory manner; and whenever, therefore, in the after progress of the case, the number of stools was deemed to be excessive, a dose or two of this latter mixture was administered, with the effect of at once diminishing them. Thus, the bowels having acted ten times during twelve hours on July 16th, two doses were administered, when the evacuations were at once reduced to two in a corresponding period of time.

It is well worth noticing that, notwithstanding what in a healthy person would have been an extremely exhausting amount of elimination by all the great channels through which effete material is discharged from the body, the general condition of the patient improved. On the 24th of July his appetite was good; his breathing, formerly so distressing, perfectly easy; and he himself was up and dressed and moving freely about the ward, which of course at that season of the year was very warm. The amount of fluid drunk and urine passed, and the number of evacuations from the bowels daily, continued to greatly exceed the average of health during his stay in hospital.

Another remark which it is as well to make, is one concerning the remarkable influence of diet on the symptoms in this case. Whenever, from temporary congestion or more permanent change in structure, the kidney is unequal to the task of eliminating the amount of urea and other effete nitrogenized materials which are ordinarily discharged by its agency, it becomes of the greatest importance to limit the amount of this material to the utmost, and thus of course, as far as possible, to rest the overtaxed organ. There can be no doubt that the amount of the products indicated is greatly influenced by the kind of food employed; that by one of which meat forms a large proportion the quantity of urea discharged daily from the body through the kidneys can be very largely increased, and in some cases even doubled. The diet, therefore, should be of such a character as will best just replace the actual tissue waste, without adding any excess to the blood for the kidneys to get rid of. No food answers this end so well as milk, which should be made the great staple of diet. The extreme importance of rigid dieting is probably not even yet so well recognized in disease of the kidneys as it is in diabetes mellitus. It is not merely necessary to insist on abstinence from stimulants, but as well on the reduction of the nitrogenized elements of the food to the least quantity compatible with the maintenance of the strength; and as the patients, when under treatment, are ordinarily either in bed or not engaged in active physical exertion, there is comparatively little waste, and equally little necessity for a meat diet. On two occasions during his residence in hospital, the patient whose case I am now considering begged me, when his appetite had improved, to allow him some meat. I pointed out to him the reasons why I wished him to abstain from this, and the probable harm that indulging in it would do him; but, as he still seemed to desire a change, I allowed him to have the full diet for a few days. By the end of that time he was so conscious of being made worse by the change, that I had no further trouble with him on the score of food. His head ached severely, the urine became slightly bloody, and he had to pay the penalty of two or three days confinement to bed owing to his indulgence. From that time, July 30th, to the date of his discharge on Sept. 3rd, he was confined to a milk and farinaceous diet. For some days previously to leaving he was drinking daily five pints of milk, the urine voided varying from 40 to 60 oz., of a specific gravity of 1·013 to 1·015, and the bowels acting from four to ten times.

He was certainly much benefited by his residence in the hospital, and was able to undertake on leaving it what he certainly could not have done when admitted—a long journey into Yorkshire. His breathing was quiet and his appetite greatly improved, but it could not be hoped, in a case so advanced, with kidneys in all probability the subject of extreme cirrhosis—causing, as I imagine, their contraction to very much less than their normal size—and with consecutive changes of a very pronounced character in the arterial system, that anything beyond amelioration could be attained; and it is much to be feared that the exposure and want of attention which the conditions incidental to his station in life would subject him to, would soon be followed by more serious if not by fatal results.

There were some striking points of similiarity between this case and that of Deane—such, for example, as the aortic obstruction, cardiac hypertrophy, previous hæmorrhage, and advanced cirrhosis; combined, however, with equally striking differences, which differences probably sufficed to explain what of dissimilarity there was in the symptoms. Thus the headache and full pulse of Moorhouse showed that the cardiac hypertrophy had been more than sufficient to overcome the resistance offered to the circulation, and this fact probably accounted for the large quantities of urine that were passed. The large elimination of urine, coupled with the diarrhœa, served probably to preserve him from vomiting and other uræmic manifestations. In Deane's case, the heart, large though it was, was not powerful enough to overcome the double obstruction at the aorta and in the vessels. His lower limbs, therefore, were cold and dropsical, and the flow through the kidney being sluggish, the urine was somewhat scanty and very albuminous. There was at that time abundant vomiting. As soon as he rallied, and the vomiting and cardiac depression were relieved, the urine was secreted in much larger quantity and the albumen almost disappeared. In the end, however, the two cases would probably come to resemble each other closely, for the heart, however large it may become, eventually is not powerful enough for the work imposed upon it, and then, if apoplexy has not occurred, either fatty degeneration and consequent syncope, or diminished flow of urine and dropsy, with increase in the amount of albumen, is likely to take place—a series of events which render it of the highest importance, as I have elsewhere insisted, to promote the freedom of the circulation by every means possible, however trivial such means may at first appear.

In the following case there was also independent cardiac and renal disease, the renal affection being very different from that of the ones just reported.

CASE 52.—DILATATION OF MITRAL AND TRICUSPID ORIFICES. INFARCTIONS IN KIDNEY. PULMONARY APOPLEXY. DROPSY. JAUNDICE. DEATH.

Isaac Tippin, a bricklayer, aged 39, was admitted into the Royal Southern Hospital on June 15th, 1876, with the following history:—He had been well up to three months ago, when he began to be troubled with cough and a sense of fulness in his abdomen. He continued work, however, for two months, but then was obliged to give up in consequence of increasing dyspnœa and palpitation, which at length became so bad as to prevent him from lying down. His cough was accompanied with expectoration mixed with blood. The legs had been swollen for two months. On admission he had the following untoward combination of symptoms, which at once precluded the hope of our being able to do more than afford temporary relief. The legs, thighs, and scrotum were very œdematous. The skin had a dusky icteroid tinge, the lips were livid, the feet and nose cold; there was tendency to constant looseness of bowels; the dyspnœa was urgent; there was a troublesome cough, with a copious and viscid expectoration; the pulse was quick, weak, scarcely perceptible at the wrist; and the urine scanty, high coloured, and rendered turbid by pink urates, but non-albuminous when tested with heat and nitric acid. On closer examination the heart was found to be enlarged in all dimensions; the impulse was diffused and wavy, and the apex-beat was carried downwards and outwards considerably beyond its normal site; a faintly audible bruit was heard with the first sound at the apex, attaining its maximum intensity over the third left interspace close to the sternum. There was very marked pulsation of the jugulars, especially on the left side. Coarse mucous râles were heard over both lungs, but there was no dulness.

He was ordered small doses of spirits of chloroform and tincture of quinine in half an ounce of infusion of digitalis, three times daily; warmth to the feet and a dry meat diet. He improved under this treatment for a time. On several occasions it was necessary to puncture the foreskin in consequence of its extremely œdematous condition, and the serum, on the punctures being made, was projected in a fine stream for a distance of some feet. On the 26th albumen appeared for the first time in the urine. On the 28th, and again on July 2nd, the legs were reported to be more swollen and the symptoms generally to be worse. The urine, which at first had been much increased in quantity, had fallen to 20 oz. daily, though the bowels were very loose. On the 3rd there were marked dulness and coarse râles at the bases of the lungs; the sputum was tinged with blood to a considerable extent; and the urine contained now a large quantity of albumen. The breathing was short but unaccompanied by pain in the chest, pulse 120. On the 5th he had a considerable hæmoptysis. The pulse fell to 74 and was very weak. Respirations 32. He complained much of severe epigastric pain, aggravated by taking food. The abdomen was tense and ascitic, and the skin had become much more yellow than when he was admitted. Every cough was followed by extreme distension of the external jugulars, which in the intervals of coughing pulsated visibly. Poultices were ordered to the epigastrium and abdomen; and half ounce doses of the French diuretic wine were substituted for his medicine. He also had 4 oz. of gin daily. On the 6th the albumen was more abundant than it had been on any previous occasion. The pulse at this time was 96, intermittent, full, but very compressible. At the time when the quantity of albumen was greatest the pulse was one of extremely low tension. This was not only obvious to the finger, but was confirmed by sphygmographic tracing. The tracing was taken with some difficulty, owing to the patient's dyspnœa and restlessness. It was at once obvious, however, from the acuteness of the angle at the commencement of the descent of the lever, and the proximity of the secondary curve to the base line, how low the tension in the radial artery really was.

As the result of the action of the French diuretic wine, the urine speedily became increased in quantity, the pulse more regular, its tension higher, the albumen less, and the symptoms generally much improved. On the 7th 60 oz. of urine were passed, and on the 8th 126 oz. The specific gravity was of course very low, being only 1·007. The reaction was slightly acid, and there was not a trace of albumen. On the 9th the following note was made:—"Urine 104 oz.; pulse 100, more regular, less intermittent; patient sleeps well, cough better, blood almost absent from sputa, swelling going down, tongue clean, bowels moved three times, appetite good." The improvement continued for some time. Before long, however, the pulse became again soft and intermittent, albumen began again to appear in the urine, the veins of the neck again to pulsate strongly and the bowels to be purged. Blood appeared once more in the sputa in considerable quantity. At 1 a.m. on the 20th, he was suddenly seized with most intense pain in the left lumbar region. After some time this left him, but at 5 a.m. he experienced a similar pain in the right loin. The pulse became very weak during the pain, and when I saw him at 3.30 p.m. was scarcely perceptible. At that time the pain seemed situated exactly over the right kidney, which was tender on deep pressure being made over it. The surface of the body was very cold, and the face congested. A rigor occurred at the commencement of the symptoms. The urine was scanty, but otherwise was not different from that of the few previous days. Very hot poultices were applied to the back, and the following draught administered:—sp. ætheris, m. 20; aq.

camph. 1 ounce. On the following day he was much better, and on the 24th had no pain whatever. The urine on that day contained more albumen than on any previous occasion. Day by day the symptoms became graver. The skin and conjunctivæ became deeply jaundiced. The jugulars pulsated violently. There was constant discharge of blood from the lungs. The bowels were more and more irritable, and the œdema, which had in a great measure disappeared, slowly again gained ground. Moist râles were heard all over the front of both chests, and over the whole of the left and the upper part of the right chest posteriorly. Over the lower part of this, the posterior part of the right chest, respiration sounds were scarcely audible, and the percussion note was much duller than natural. A few days later he became quite childish in manner, and later still could hardly understand anything that was said to him, although not comatose. He slowly sank, dying on August 8th, seven weeks after admission.

Sectio cadaveris. The heart weighed 20 oz. It was uniformly enlarged, both ventricles were dilated, but the left more so than the right. Both the right and left auriculo-ventricular orifices were much enlarged, the left measuring 4⅛ inches, and the right 5 inches. This of course admitted of much tricuspid regurgitation, and explained the jugular pulsation. The lungs were congested, and the base of the right one solid and black from apoplectic discharge. The liver weighed 3 lbs. 14 oz., but beyond being congested was not unhealthy. There was no obstruction in the ducts. The kidneys together weighed 12 oz., the left being 5 and the right 7 oz. The left one was flattened but had about the ordinary superficial extent. A considerable part of its surface was mapped out by large yellowish-white patches, the areas supplied by the infarcted vessels. The extensive deprivation of nutrition caused by these infarctions accounted for the flattened and thin state of the organ. The capsule came readily off from the entire surface. On cutting in various directions through the organ many smaller white masses, similar in texture and consistency to the others, were observed, some as large as a split pea, others no larger than a pin's head.

This case seems strikingly to prove the utility of treatment even under very desperate circumstances. From the first it was obvious that the patient could not live long; yet, under the use of digitalis and rest, he became temporarily much better, and on a subsequent occasion, when his condition seemed all but absolutely hopeless, he revived in a most remarkable manner, apparently under the employment of the French diuretic wine. It may not be right, perhaps, to attribute the entire result, which was indeed very striking, to the use of that compound because immediately before commencing to take it he had had a considerable hæmorrhage from the lungs, and this natural bleeding, by indirectly relieving the general congestion, possibly gave the medicine a chance of being absorbed, and enabled it to produce effects which it may not have produced if it had been given at any other time. I have more than once found, as is mentioned at page 60, that, when in extreme conditions of cardiac dropsy no diuretics would have any effect, the administration of these immediately after the abstraction of a few ounces of blood by leeches was followed by a copious flow of urine and the speedy subsidence of the swelling. The patient, however, considered that all the benefit was derived from the medicine, and begged that it might be continued.

COMBINED PULMONARY AND RENAL DISEASE.

That there is no necessary connection between phthisis pulmonalis and any derangement of the kidneys must be known to every physician who has had much experience of the former disease. The rule certainly is that the urine of phthisis deviates but little if at all from that of health. From a careful examination in a very large number of cases of patients of various ages, and in different stages of the disease, I have come to the conclusion that there is scarcely more deviation in the character of the urines than there would be in that of as many patients in ordinary health. Certainly the occurrence of albumen is very exceptional. Thus, I have the records of 121 cases of chronic pulmonary phthisis in which the character of the urine in this as well as other particulars was carefully noted, and in the urine of only four, in addition to the one whose case is described, was there any albumen. In one of these it was present merely as a trace, and that but on one occasion during his two months' residence in hospital; on the other days not even this trace being detectable. In another case the urine is spoken of as having been "highly albuminous, specific gravity 1·010, acid, 26 oz. voided in twelve hours" on July 17th, 1873; as "highly albuminous, specific gravity 1·010, neutral, 20 oz. in twelve hours" on the 19th; while on the 23rd of the same month, in addition to the note that there was a great quantity of albumen present, the urine is said to have been high coloured and to have had traces of blood. The patient was a male aged thirty, and had had symptoms of phthisis for five months, the pulse ranging from 88 to 96, and the respirations being nearly constant at 28. A third case was the very counterpart of that of Hughes; while in the fourth the renal disease was more acute in character, the kidney *post-mortem* not much enlarged or otherwise strikingly altered, the urine durine life having a deposit consisting of immense numbers of large granular casts, and the apices of the lungs being occupied by several sharply defined abscesses filled with a reddish thin pus. The patient was a male aged 60, and the kidneys weighed respectively 5¼ and 6¾ oz. In a great many other cases of pulmonary phthisis of which I possess records, the absence of albumen would be a fair inference from the other characters of the urine that are noted; but as this absence is not specifically mentioned I do not include them. It is obvious, however, that to say the least there is nothing in the condition of system induced by pulmonary phthisis which would favour the development of any of those morbid states of the kidney that find their manifestation in albuminous urine, or we should find that symptom present much oftener than once in 25 or 30 cases. The proportion stated above does not differ markedly from that given by Dr. Parkes, who found albumen present "only in one of twenty-eight cases (3·6) per cent., and in that instance it was temporary." The rarity of albumen in the urine in phthisis contrasts strongly with its frequency in pneumonia. Thus in forty-one of my cases in which the condition of the urine in this particular is noted, I find that albumen was present in sixteen. Dr. Parkes found it six times in thirteen cases.

But whether, in addition to the fact that phthisis does not *favour* the development of Bright's disease, as most physicians now agree, it can be maintained that there is anything in the condition induced by the one disease actually tending to *prevent* the development of the other, must be held to be doubtful. Dr. Bright himself certainly thought that the pre-existence of the disease or diseases that are now called after his name tended to prevent the development of tubercle; though he manifestly did not regard the two affections as absolutely antagonistic, as his third case is one in which, with suppurating cavities in the right lung, and a less advanced stage of tuberculization in the left, there was disease, certainly of some standing, in the kidneys.* The difficulty lies in determining the relative ages of the morbid processes in kidney and lung when both organs are affected, so as to tell whether Bright's disease preceded phthisis or the reverse. Rayer's opinion was decidedly in favour of the kidney affection being secondary, as the following quotation will show: "Dans le plus grand nombre des cas de coïncidence de la phthisie avec la néphrite albumineuse, l'affection rénale se déclare dans le cours de la phthisie, dont elle est, pour ainsi dire, une affection secondaire."—Rayer, vol. 1, p. 325.

In those comparatively rare cases of phthisis in which the kidneys do become changed, the change may be one of two kinds, so far as I have observed. Firstly, and more commonly, the organs may be large, white, and smooth—exactly resembling those of the form of Bright's disease now generally known as chronic parenchymatous nephritis. The concurrence of this affection with phthisis is probably little more than accidental, the condition of the kidney being most likely merely the remote result of a not very acute inflammatory process, to which the subjects of phthisis, so far as I know, would be neither more nor less liable than other people. The kidneys in the fourth case mentioned above, would probably have become of this kind if the patient had lived much longer.

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* *Reports of Medical Cases*, by Richard Bright, 1827, p. 12.

Secondly, the kidneys, while, like those now mentioned, larger and paler than natural, may be of an irregular shape from the projection of variously sized masses beyond the general surface; and when cut into may display, corresponding with those external projections, scrofulous deposits in different stages, some in a condition of chronic ulceration and discharging a cheesy pultaceous matter, others just about to break down, and others again as yet unsoftened.

I will give a few cases illustrative of the clinical history, where the combination of either condition with that of pulmonary phthisis exists. Sooner or later such cases are sure to terminate fatally, death being almost invariably hastened by diarrhœa, due to tubercular ulceration of the intestines.

CASE 53.—PHTHISIS. ACUTE NEPHRITIS. ALBUMINURIA. DIARRHŒA. DROPSY. DEATH.

Thomas Hughes, a labourer, aged 39, was admitted into the Royal Southern Hospital, under my care, on April 7th, 1876. He said that with the exception of a slight cough which he had had for years, but which he had not thought worth noticing, he was quite well up to the preceding Christmas, but that just about that time he caught cold owing to a severe wetting; that he then began to suffer from pains in the loins, and noticed that his urine became scanty and high coloured. Shortly after this, first the feet and then the legs, scrotum, and abdomen successively began to swell, and about the time of the swelling commencing in the feet he spat a little blood, at first pure and then mixed with phlegm. He had not frequently drunk to excess. His principal beverage has been beer. His work as a quarryman has exposed him very much to wet and cold. On admission his lower extremities and abdomen were much swollen. The face was pale, rather thin, and not at all œdematous. He had a cough and spat a good deal of gelatinous muco-pus. There were moist râles and creaking sounds at the right apex, with a sharp click at the commencement of inspiration. On the left side the breathing was harsh. The area of cardiac dulness was not increased, nor was the apex-beat displaced, but the sounds were heard loudly towards the right, being conducted by the solidified pulmonary tissue. He complained of pain in the abdomen, increased by eating or drinking. The abdominal veins were slightly enlarged. His urine was scanty (6 oz. during the first twelve hours), specific gravity 1·036, acid, smoky, containing a deposit of urates, and intensely albuminous, becoming almost solid on the application of heat and nitric acid. A large mustard plaster was applied to the loins, and a smaller one to the chest, which was painful, the hot air bath given at night, and the mixture of acetate of ammonia every fourth hour, and, the bowels being at first confined, a few doses of bitartrate of potash were administered. This treatment, with the exception of the bitartrate, was continued for a fortnight, with the effect of gently acting on the bowels, relieving his abdominal pain, and greatly increasing the quantity of urine. Thus while, on the 11th, only 22 oz. were passed in the twenty-four hours, having a specific gravity of 1·035, on the 14th, 56 oz., specific gravity 1·009, and on the 15th, 68 oz., specific gravity 1·010, were passed. The albumen continued, however, to be very great; and though so much more urine was voided, there was no perceptible difference in the amount of dropsy. The fluid drunk was considerable, as thirst was a marked symptom from the outset. This varied from 80 oz. on the 12th, when 25 oz. of urine were passed, to 130 on the 17th.

On the 22nd, 36 oz. of urine were passed, specific gravity 1·023. It was high coloured and contained a very large quantity of albumen. The amount of urea was decidedly low, being not more than 1·45 per cent., or 231·9 grains in the day. He was at this time spitting very profusely, and it was thought that perhaps urea might be contained in the sputum, as there was so small a proportion in the urine. A portion of this was therefore taken and boiled for some time with liquor potassæ, filtered and tested, but was found to contain only a trace. The bowels were at the same time constipated, so that urea could not have been eliminated through that channel. As no effect was produced on the dropsy by any of the other means employed, I had a fine trocar introduced into the upper and outer aspect of the right thigh. It was passed obliquely into the subcutaneous cellular tissue, so as to lie by its free part flat against the skin, to which it was fastened by strips of plaster, a pad being placed beneath it to prevent undue pressure. A fine elastic tube, which had been fitted over the mouth of the trocar before it was inserted, conducted away the discharged fluid into a vessel beneath the bed, and prevented this from being wetted.* During the first twenty-three hours, 34 oz. of perfectly clear fluid flowed through the tube. I examined a portion of this fluid, with the following result:—A very small floating transparent coagulum formed in it after some time, and as well a few fine opalescent membranous threads. This coagulum quickly broke up and disappeared. The fluid had a specific gravity of 1·007, contained *very little* albumen, and only ·1 per cent. of urea. On the other hand, there was a large quantity of sodium chloride. In its general characters, therefore, it resembled the fluid of a hydatid cyst. Five c.c.'s

* This was before I had become acquainted with Dr. Southey's trocars.

contained ·055 gramme of total solids, of which ·02 was organic, and ·035 inorganic. There was a very much larger proportion of albumen in the urine than in this effused fluid. The tube fell out during the night of the 28–29th, and it was not reintroduced, the discharge keeping up very freely through the orifice left by it.

During the progress of the case, the most painful symptoms were recurring abdominal pain increased by eating or drinking; occasional vomiting; a red, dry, and sore tongue; occasional diarrhœa; and cough with profuse muco-purulent secretion. These all became intensified as time went on, relief for a few days being soon followed by more marked exacerbation. The tongue became at length so extremely sore and dry that he could hardly protrude it, and could with difficulty be induced to take the simplest nourishment. The abdomen at the same time became more tumid and painful, the tumidity being due to distension of the bowels and infiltration of the subcutaneous cellular tissue, and not to ascites.

It was obvious very early that the case would end fatally, and that all that could be done would be to alleviate suffering. The extensive tuberculization of lung and ulceration of intestine, of which we had indubitable signs, left us no hope of any other issue, even if there had been no affection of the kidney itself.

The patient died on May 19th, and the following is the result of the post-mortem examination :—There was great emaciation in the non-dropsical parts. Both pleuræ were very adherent. The lungs were studded almost throughout with hard grey granulations. In the apex of the right one there were also several vomicæ, the largest of the size of a hen's egg, with non-vascular, smooth, white, hard walls. Heart normal. The kidneys were much enlarged, the right weighing 8½, and the left 9½ oz. The surface was smooth and mottled, the colour generally being very pale. The capsule peeled off very readily. The cortex, on section, was seen to be of a dead white hue. Its appearance was very much that of figure 2 in Bright's 4th plate. On a small piece being squeezed, and the drop of thickish matter thus obtained viewed with a ⅛ in. object glass and No. 2 eye piece, a number of casts of tubuli lined by very granular cells were seen, with many isolated cells and much free fat. The spleen was extremely hard and curved, and weighed 9½ oz. The liver was but slightly changed; its weight was 57 oz. The whole of the mucous membrane of the ileum was studded with tubercles, very many of which had softened and produced ulceration. The tubercular masses varied in size from minute points to spaces as big as a split pea. When squeezed these gave out a white creamy fluid. Many of them had run together, and formed ragged lines of ulceration, half way or more round the bowel in different places. The mucous membrane of the jejunum was very dropsical. There was one large circular ulcer as big as a shilling in the colon. Many of the ulcers were acutely inflamed, and had red and irritable margins. The lymphatic glands near the spine, and the bronchial glands were a good deal enlarged; the mesenteric glands not so.

It is not quite certain which organ was first affected in this case—the kidney or the lung. That both had been diseased for a considerable time was evident from the post-mortem appearances. From his having for years had a slight cough, however, and from the absence of any urinary trouble till the preceding Christmas, it is probable that the lung was *first* diseased.

The combination of symptoms presented by him, viz.: phthisical cough and albuminuria, is most grave, and, when associated with diarrhœa, almost inevitably leads soon to a fatal result. The cutaneous tissues quickly break down, and much care is required to avoid bed-sores. The diarrhœa was best controlled by the combination of bismuth, acacia, and magnesia, previously alluded to as recommended by Dr. Theophilus Todd Thompson in the diarrhœa of phthisis. It was once or twice necessary to introduce a few minims of laudanum into the bowels as an enema, in order to relieve the severe abdominal pain.

ALBUMINURIA AND DIPHTHERIA.

Albuminuria is a very common accompaniment of diphtheria, occurring usually during the febrile condition and while the exudation is still present, and not, as with scarlatina, after the lapse of a week or more from the subsidence of acute symptoms. The following, for example, is an ordinary case:—Miss E., aged 26, complained of sore throat after a drive on February 18th, 1877, and was seen on the following day. There was then very much inflammation of the tonsils and surrounding parts, and a slight exudation. On the following day the false membrane was present over both tonsils and the false palate and uvula, the parts being swollen and painful during deglutition. Temperature, 102° F.; pulse, 85. The urine was not then saved, but on the following day it contained $\frac{1}{4}$ albumen, an abundant deposit of urates, was very acid, and had a specific gravity of 1·021. During the course of the affection there were a few very long, fine hyaline casts. Warmth to the surface, counter-irritants to the loins, and diaphoretics were employed, and all the renal symptoms, as is usual, rapidly subsided.

The following case, however, deviated in some respects from the ordinary run.

CASE 54.—DIPHTHERIA. RIGHT HEMIPLEGIA. ALBUMINURIA. RECOVERY.

On March 28th, 1877, I was requested by Dr. S. A. Lucas to see with him Miss G., a young lady aged 18, who, a day or two previously, had become hemiplegic. For a fortnight previous to the 24th she had complained of sore throat and partial loss of voice. On the morning of the latter day a noise was heard in her bedroom, and she was found to have fallen heavily on the floor on having attempted, in response to a call, to get out of bed. We found her in bed suffering from complete right hemiplegia and inability to articulate, the only two words uttered, and these very faintly and indistinctly, being "sess" for "yes," and "no." The tongue inclined much to the right, and the cheek was drawn to the left. There was no loss of sensation. She was an intelligent, pleasant-looking girl, and understood everything that was said, but though apparently desirous of speaking, was unable to utter more than the two words mentioned. On examining the throat a white patch, bordered by a lurid red margin, was seen at the upper part of the right tonsil, and a good deal of capillary injection of the entire surface of the soft palate and parts around. Every attempt to drink induced cough. No fluid returned through the nose. Heart, lungs, and liver appeared normal. Pulse, 100. The urine, of which a fair average amount was said to have been passed, had the following characters:—It was at first quite clear, and remained so for more than an hour after having been passed. It then gradually became very turbid, and threw down a dense pale deposit, on the upper part of which was a red layer. The deposit consisted of urates, and the red layer of variously shaped crystals of uric acid. The reaction was strongly acid, the specific gravity 1·041, and there was present a very large amount of albumen, but no sugar. Microscopically examined, there was found, in addition to the urates and uric acid, bladder epithelium, but neither blood nor casts. On analysis it was found to contain 3·4 per cent. of urea. Five c.c. weighed 5·151 grammes, and contained ·313 gramme total solids, of which ·215 gramme was organic, and ·098 gramme inorganic, the ratio of inorganic to organic being as 1 : 2·3. It was obvious that the secreting power of the kidney had not been interfered with, or 3·4 per cent. of urea could not have been eliminated. The relatively large proportion of inorganic constituents corresponded also with this large quantity of urea, and convinced us that, notwithstanding the large amount of albumen, the kidney structure was sound. We prescribed warmth to the surface; a sinapism, followed by linseed-meal poultices, to the loins; a lotion containing ʒj of liquor sodæ chloratæ to ℥j of water, to be applied frequently to the tonsils; a light, nutritious, but non-stimulating diet; and the following mixture, viz., ammon. carb. gr. xxiv.; pot. bicarb. ʒij; liq. strychniæ m. 40; aquam ad ℥viij; ℥j to be taken three times a day with 10 grains of citric acid; and it was agreed that the strychnia should be gradually increased up to the point of producing twitchings. On the 31st I again saw her and examined the urine. There was some uncertainty as to the exact quantity passed, but from what was said I judged that it was somewhat below the average amount; specific gravity, 1·038; reaction neutral. It contained a deposit of triple phosphate and a good deal of bladder epithelium, but no casts, and scarcely a trace of albumen. Five c.c. weighed

5·168 grammes, had a total residue of ·265 gramme, of which ·164 gramme was organic and ·101 gramme inorganic, the proportion being 1 : 1·6. The urea was not estimated, but the quantity was doubtless very great. The difference in the total solids and the organic constituents would be exactly accounted for by the difference in the amount of albumen. The inorganic constituents were almost the same on the two occasions, being slightly greater on the second.

I subsequently learned from Dr. Lucas that a sister of the patient had a similar condition of throat without any paralysis, and that the patient herself ultimately got quite well.

It is very rare, indeed, for urine with so large an amount of albumen as was contained in the case of this patient to have so high a specific gravity as 1·041. The large amount of urea, and the deposit of uric acid also, are by no means common accompaniments of albumen in the quantity in which it existed in this case, though they cannot be said to be very rare.

CHAPTER XII.

DERANGEMENTS OF URINE NOT DEPENDENT ON DISEASE OF THE KIDNEY.

IN concluding, I will only mention two or three examples of derangement of urine where the kidney is free from disease; for to illustrate them all would be to write a large volume.

Cases of polyuria without evidence of organic disease of the kidney and without sugar occasionally present themselves. The following is an example:—

CASE 55.

Mr. S., an artist, aged 70, consulted me on April 16th, 1877. He was pale, but stout. He gave the following history:—He had always had remarkably good health until six months previously, when he was persuaded by a friend to take a Turkish bath. He was not unwell, and took the bath merely to oblige his friend. He was exposed to a dry heat of 228° F. during a part of the process, felt extremely hot at the time, and had never been well since. The symptoms which followed this bath were immediate giddiness on standing; for a month the most profuse perspirations from the head; and, ever since the bath, polyuria. Three quarts of urine are passed every night, and about two during the day. The desire to micturate during the night is uncontrollable and incessant. It commences with a titillation, which very quickly passes into a sensation that compels him to empty the bladder, and as but little urine is voided at any one time, the whole night is spent in the alternation of fitful dozes of a few minutes' duration and micturition. The giddiness is most felt on standing and looking up. He is quite unable to continue his portrait painting. I obtained and examined some of the urine passed over night. Five c.c.'s of it weighed exactly five grammes. On evaporating this quantity to dryness, I found ·065 gramme of total solids, of which ·035 was organic and ·030 inorganic, *i.e.*, the inorganic and organic constituents were nearly equal. I find no note concerning the amount of phosphates. It is merely stated that earthy phosphates were precipitated by heat.

I prescribed 30 m. doses of the ammoniated tincture of valerian with 10 minims of tinct. belladonnæ, and at night a morphia suppository. The suppository did not, as I hoped it would, allay the irritability of the bladder, and allow of more complete sleep; but the quantity of urine was diminished, and the giddiness and other symptoms were so much improved in the course of a fortnight as to allow of his again resuming his professional work, though he continued unwell, and I was not able to hold out the hope of more than amelioration of a condition that had been so firmly established for so long a time.

What was the cause of the polyuria here? It came on so definitely after exposure to an extremely high temperature, up to which exposure the health had been uniformly good, and it was so associated with other symptoms referable to disturbed circulation, that the most probable conjecture seemed to be that under the influence of this very high temperature a change, probably through the medium of the circulation, had been induced in that portion of the nervous centre (if such there be) which controls the vascular supply to the kidney, by which this vaso-motor centre had been more or less completely paralysed. The concurrence of very profuse sweating from the head and face certainly favoured the idea of vaso-motor disturbance.

He called on me for the last time on the 13th of May. He was much improved, but still far from being so well as before his unfortunate experiment with the bath. The urine had fallen considerably in quantity. From his account it was probably but little more than half of what it had been. He had with him a portrait, which he was engaged on. He was, therefore, again pursuing his avocation. Still the giddiness disturbed him, and he was pale, anxious-looking, and distressed. In addition to the valerian, I prescribed for him and recommended him to persevere with the use of iron and strychnia.

Usually, as in the above case, the urine in polyuria, where no sugar is present, is of low specific gravity. A case is, however, related in the third vol. of the *Medico-Chirurgical Transactions*, by the late Dr. Bostock, of Liverpool, in which, while five quarts were passed in twenty-four hours, the specific gravity was 1·034.

Valerian is, perhaps, the drug which most powerfully controls a profuse flow of non-saccharine urine, and the one which, if the patient be young or middle-aged, and there be no serious organic disturbance of the nervous centres, will possibly cure it. It may be given either as powder in from 10 to 20 grain doses, or in any other of its medicinal forms. Trousseau has borne strong testimony to its value. Dr. Bradbury, of Cambridge, published some striking instances of its utility in the *Lancet* of January 11th, 1873, as, indeed, have many other writers. Occasionally, however, it has little or no effect. Ergot, in some form, will then not unfrequently markedly control the amount of urine passed. The constant current has also been employed. M. Teissier, in his recent book on "The Therapeutic Value of Continuous Currents," relates a case that was cured by feeble permanent currents.

As an example of the control which ergot, under some circumstances, has over the urinary secretion, I may mention the case of Adolphe Behrens, aged 32, who was admitted on September 8th, 1876, for diminished power in the right leg and failure of sight in the right eye, following a severe blow on that eye some months previously, and attended now by almost daily shaking of the right foot for about fifteen minutes on the patient's first waking, which shaking has twice passed into general convulsions, attended with coma, and biting of the tongue. The amount of urine at once fell from 100 oz. to 49 oz. in the first twenty-four hours after the administration of 1 gr. of ergotine three times daily. The pain in the head and convulsive movement of the leg were also relieved, so that, after an immunity from these for four weeks, he was discharged apparently well on November 1, 1876. The 100 oz. of urine contained 65·712 grammes of solids, of which 17·76 grammes were inorganic, and 47·952 grammes organic; whereas, on the next day but one, when the amount was 56 oz., the total solids equalled 71·48 grammes, of which 26·56 were inorganic, and 44·92 organic. It did not appear, therefore, to diminish the proper urinary constituents, but simply the water. The specific gravity of the first was 1·015; urea, 1·05 per cent.: that of the second, 1·020; urea, 1·25 per cent.

In some hepatic affections, a large quantity of urine of very low specific gravity is voided for weeks together. Thus, Margaret Headley, a married woman, aged 27, was admitted on January 10th, 1878, suffering from pain in the lower part of the right chest and the adjacent portion of the abdomen. She was slightly jaundiced, and had been so, she thought, for about three weeks. There was much pain on making even slight pressure over the liver, which was enlarged. A loud, coarse friction sound was heard over the lower two-thirds of the right chest posteriorly. She was pale, but quite stout; the tongue large, moist, and indented, and the bowels tending to constipation, but, when acting, yielding large, dark, non-offensive motions. The temperature at intervals oscillated considerably, the highest point reached, and that only on one night, being 104°·2 F. Generally it was between 98° F. and 101° F. She passed large quantities, sometimes nearly eight pints in the twenty-four hours, of a clear, acid urine, having at one time a pale amber, and at another a pale straw colour, the specific gravity varying from 1·003 to 1·010, traces of bile pigment being sometimes present, and at others not; the chlorides also being sometimes entirely absent, and at others present in fair quantity. Frequently, when the quantity of urine was very large, she had at the same time most copious perspiration. She left the hospital on March the 13th, the temperature having been normal for five days, and the urine varying during that period from 50 to 68 oz. in the twenty-four hours.

The treatment was mainly directed to subdue the perihepatitis, but comprised, during its later stages, large doses of the ammoniated tincture of valerian and sulphate of quinine.

It was often a matter of conjecture with me, in this case, whether a more or less complete paralysis of the renal vasomotors occurred at intervals, owing to implication of the solar plexus or splanchnics in the morbid process affecting the liver.

I have alluded to the effects of diet on alkaline urine. Patients are frequently much concerned on observing a turbidity in the urine when first passed, and will seek advice for this. I have known such urine to have been passed for many weeks together. The turbidity seldom affects that which is passed the first thing in the morning. But the urine at other times of the day is alkaline or neutral, coated often by a greasy film, and throws down a dense deposit of usually amorphous phosphates. There is rarely any pain during micturition, at most merely a slight scalding, and this only when the deposited phosphates are in greater amount than usual. The first portion of the urine is often clear, the turbidity appearing and increasing towards the end of micturition. The accession of catarrh, and many other circumstances, will markedly increase the mischief. This condition can usually be readily controlled by such a change of diet as that indicated on p. 248, with, if necessary, pepsine at the time of meals, and nitro-hydrochloric acid in a bitter infusion about half an hour afterwards. This medicine alone, without the radical change of diet, will frequently be useless.

A great many other derangements of urine, unattended by organic disease of the kidney, such as those depending on the presence of cystine, sugar, albumen temporarily, an undue amount of urates or uric acid, or on other circumstances, frequently occur to every practitioner. A remarkable example of the first-named deposit, from the age of the patient and the large quantity of the cystine that was voided, came under my notice in February, 1876. The specimen of urine was brought to me by Dr. Harvey, of Wavertree, in whose practice the case occurred. The patient was a little girl, aged two years, who had been out of health for some time, and whose urine was observed to be densely loaded with a white deposit, which was said to be passed in very large quantities, and which, when I examined it on February 16th, I found to consist wholly of cystine. Removal to the sea-coast and a tonic treatment was soon followed by relief, and when I next examined the urine, after the interval of a week, the cystine had disappeared, but there was a large deposit of urate of soda and lozenge-shaped crystals of uric acid, the specific gravity being 1·037. On the 10th of March, when I examined it for the third time, the specific gravity had fallen to 1·027, there was no deposit whatever, and the patient had nearly regained her usual health.

APPENDIX.

NOTE A.

I have stated that the occurrence of albumen in the urine withdrawn from the bladder after death affords no presumption of its existence during life. The following is the evidence on which this statement is founded:—By my wish the urine has been drawn off after death from the bladders (when they contained any) of those patients who have died in the Royal Southern Hospital for some time past, unless it was known to have been albuminous during life. The urine thus obtained has been filtered when necessary, and then examined for albumen. In a large number of cases the bladder was found to be empty, as though a discharge of urine had been among the last acts of life, or the kidneys had for some time ceased to secrete it before death. I have obtained the records of thirty-nine examinations. In three of the cases no albumen was found. These were cases of Addison's disease; long continued jaundice from occlusion of the common bile duct; and dysentery. In all of the others it was present, though in one, a case of bronchitis, in very small amount—merely a trace. These thirty-six cases are divisible into three classes. Firstly, in thirteen of them the absence of albumen was positively determined by frequent examinations during life. The diseases were of the most various kinds. Secondly, in fifteen there was *probably* no albuminuria, as, in all, the kidneys were quite healthy, and in most cases the death was sudden and accidental during health. Six of them were due to fracture of the skull; two to fracture of ribs; two to the bursting of an aneurism; two to phthisis; and one each to apoplexy, œdema of the glottis, and drowning. Thirdly, eight cases are doubtful, no examination for albumen having apparently been made during life. These were apoplexy, two cases; disease of heart without dropsy, two; bronchitis, two; and one each of pyæmia and pneumonia. In the great majority of cases, therefore, it is probable that the post-mortem urine will be found albuminous, whatever may have been the cause of the patient's death. The late Dr. Basham's opinion that it is always so, was, however, incorrect, as in 7·7 per cent. of the above cases it was non-albuminous.*

NOTE B.

ON THE RAPIDITY OF ELIMINATION BY THE DISEASED KIDNEY.

I have expressed my opinion that alcohol is generally injurious to the subjects of chronic kidney disease; but at the same time a doubt whether this injury is due to its prolonged retention within the system, owing to the defective eliminating power of the kidneys. The opinion is founded on clinical observation; the doubt on a careful observation of the time taken by diseased and healthy kidneys to eliminate substances the reaction of which is so delicate as to render their recognition easy. For the last few years I have made many such observations, sometimes employing santonine, at others salicylic acid or one of the salicylates, with the result apparently of showing that sometimes the kidney will, even when advancedly diseased, eliminate such substances with the same rapidity as in health, while at others it will do so much more slowly. The following examples, I think, establish this proposition:—On the morning of the same day all medicines were withdrawn from two patients, of whom one was suffering from cirrhosis of the kidney, and the other from chronic parenchymatous nephritis. The first patient was a man of large and powerful build; non-dropsical; well nourished; having a healthy colour; with hypertrophied left ventricle; a radial pulse of high tension (the highest pressure of the sphygmometer—800 grammes—failing to obliterate it); and a copious flow of pale, specifically light, acid urine, containing a slight amount of albumen. The second was exceedingly dropsical; very anæmic; without cardiac hypertrophy or increased arterial tension, and passing a medium quantity of pale, faintly acid, extremely albuminous urine. Each patient emptied his bladder at 10.30 A.M., and at 11 A.M. took 15 gr. of salicylate of soda dissolved in an ounce of water. Similar diets were given, and no restriction put upon the amount of water drunk. Every micturition was made into a separate urine glass, a label marked with the hour immediately put on, and the glass locked up for future examination. In the case of cirrhosis, the first urine passed after the administration of the medicine was at 11.18. This contained no trace of the salicylate. Micturition again at 12.58. Distinct, but not deep, purple colour with perchloride of iron. At the next micturition, at 1.42 P.M., very deep colour. Indications of the presence of the salicylate were obtainable until 7.30 P.M. of the following day, after which they were absent. Thirty-two and a half hours were therefore required for the complete elimination of the drug. Total urine voided, 87 oz. The patient with chronic parenchymatous nephritis voided urine, for the first time after taking his dose, at 11.45. There was then a slight reaction indicative of the presence of the salicylate. In thirty and a half hours all trace of it was lost. Total urine passed, 37½ oz.

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* Basham, *On Dropsy from Kidney and Heart Disease*, 1st edition, p. 192.

Again at 10 P.M., on September 14th, 15 gr. of salicylate of soda were given to a patient who was the subject of dropsy, diarrhœa, and slight yellowing of skin. His limbs and face were œdematous, the urine so albuminous as almost to solidify on the application of tests, but secreted rather freely. There was no cardiac hypertrophy. No urine was voided until 1 A.M. of the 15th, when the presence of the salicylate was very obvious. It continued to be present until after 5.40 A.M. of the 17th, a period of 55 hours 40 minutes.

A similar dose was given to two healthy individuals on June 5th, 1871. Traces appeared in the urine passed fifteen minutes afterwards, and it was recognisable for thirty hours, after which there was no trace.

NOTE C.

ON THE SPECIFIC GRAVITY OF THE KIDNEY IN HEALTH AND DISEASE.

I have determined the specific gravity of the kidneys under various circumstances. In the adult male, the organs being healthy, it averages 1·054. In young children of from four to five years of age, it is less, viz., from 1·047 to 1·048. It is highest, so far as I have observed, in albumenoid or lardaceous disease, when it reaches 1·060. In interstitial nephritis it is always, I believe, less than in health, ranging from 1·039 to 1·048. In advanced valvular disease of the heart, with chronic dropsy, it is also always low, ranging from 1·030 (the lowest) to 1·045.

NOTE D.

The practice of the frequent instillation of a strong neutral solution of strychnia or its sulphate into the eye, is one which I learned from my friend, Mr. George Walker. I became acquainted with the very remarkable effect produced by it on the rapidly failing vision of an elderly gentleman under his care, whom I subsequently saw in consultation with him for an affection not connected with the sight; and as the result of this, and of Mr. Walker's strong recommendation, I have myself employed it, and certainly with much advantage. Though causing a little smarting, it is less painful than the hypodermic injection, while it acts more rapidly than when administered by the mouth.

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ERRATA.

Page 2, line 7, and throughout the work, *read* Dr. Dickinson, not Dickenson.
,, 17, line 19, for "water" *read* "urine."
,, 21, line 3, for "acue-like" *read* "acne-like."
,, 29, line 16, for "grammes" *read* "gramme."
,, 40, line 17, for "gall" *read* "galls."
,, 48, line 15, for "402" *read* "4 oz."
,, 77, last line but one, for "·15" *read* "1·5."
,, 80, line 11, for "oxatate" *read* "oxalate."
,, 80, line 16, for "75·75" *read* "·75."
,, 99, last line, delete "Case 19."
,, 103, line 6, for "granule" *read* "granulation."
,, 109, line 19, *read* "over the left side, while the right side," &c.
,, 114, third line from bottom, for "originally" *read* "organically."
,, 121, line 23, for "Bertels" *read* "Bartels."
,, 131, line 15, for "muroxide" *read* "murexide."
,, 140, line 16, for "generally" *read* "in a limited sense."
,, 202, line 21, for "poms" *read* "pons."
,, 205, last line but two, for "·2" *read* "2."
,, 206, line 22, *read* "disease, recurring œdema," &c.
,, 218, line 25, for "sesquichloride" *read* "sesquichloridi."
,, 220, last line but three, for "Ennun opii ʒ" *read* "Enema opii ʒ."
,, 238, line 13, for "1·002" *read* "1·022."
,, 256, last line but two, for "actions" *read* "arteries."
,, 272, line 10, for "a few cases" *read* "a case."
,, 272, line 11, for "either" *read* "the former."